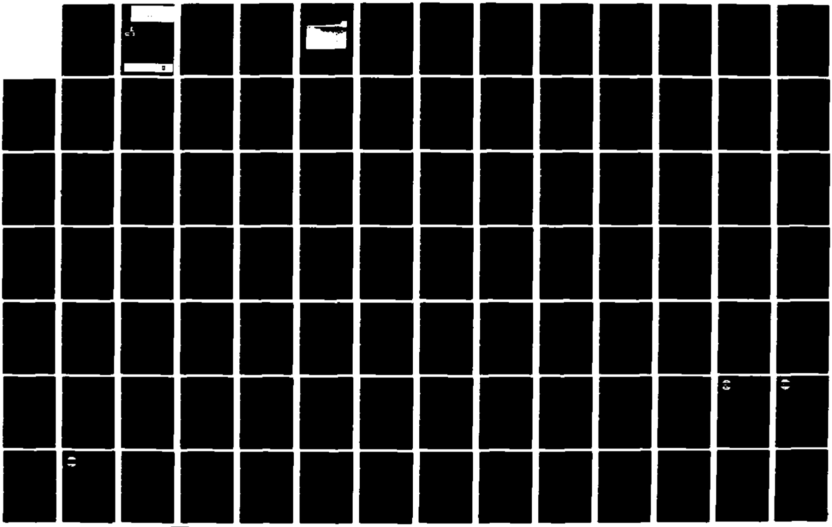
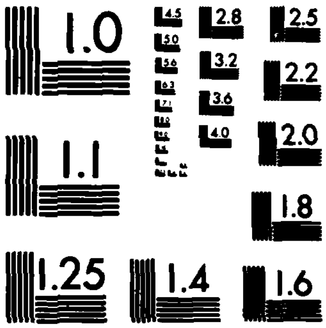
AD-A127 212 GREAT I STUDY OF THE UPPER MISSISSIPPI RIVER TECHNICAL APPENDIXES VOLUME 5 FISH AND WILDLIFE PART II(U) GREAT RIVER ENVIRONMENTAL ACTION TEAM M J VANDERFORD SEP 80 1/5

UNCLASSIFIED F/G 13/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

GREAT I
STUDY OF THE UPPER MISSISSIPPI RIVER

TECHNICAL APPENDIXES

VOLUME 5

6

FISH & WILDLIFE
PART II

The GREAT River

1980

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A127 212
	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) GREAT I STUDY OF THE UPPER MISSISSIPPI RIVER, VOLUME 5: Fish and Wildlife	5. TYPE OF REPORT & PERIOD COVERED
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Vanderford, Michael J.	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Great River Environmental Action Team.	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Department of the Army Corps of Engineers, St. Paul District 1135 USPO & Custom House, St. Paul, MN 55101	12. REPORT DATE September 1980
	13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report)
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Volume 5 issued in two volumes

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

FISHES
WILDLIFE
Mississippi River
Wetlands

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The report confirms the decline in backwaters habitat due to sedimentation and describes extensive pilot projects in backwater rehabilitation. Recommendations are given such as partial blocking of dams to reduce sediment influx, culvert design, side channels, and also attempted to predict biological results of physcial changes in river and inventories vegetative character of habitats.

September 1980
(Second Edition)

FISH AND WILDLIFE WORK GROUP I

FINAL REPORT

to the

GREAT RIVER ENVIRONMENTAL ACTION TEAM I

(In Two Volumes)

Michael J. Vanderford

Editor

The Combined Report of the Fish and Wildlife Management Work Group and the Side Channel (Openings) Work Group of the GREAT I.

Work Group Chairmen

Fish and Wildlife Management

Donald F. La Pointe - 1974-75
Joseph F. Scott - 1975
Dennis E. Chase - 1975
Michael J. Vanderford - 1976
John P. Wolflin - 1977-78

Side Channel (Openings)

Joseph F. Scott - 1974-75
Michael J. Vanderford - 1975-78

Fish and Wildlife Work Group

John P. Wolflin - 1978
Michael J. Vanderford - 1978-1980

GREAT address: 1135 U.S. Post Office and Customs House, St. Paul, Minnesota 55101

APPENDICES

OLD MAN RIVER . . . HE JUST KEEPS ROLLING ALONG

- IF WE CARE -

(photo of main channel near La Crosse by Patrice Wagner)

September 1980

FISH AND WILDLIFE WORK GROUP FINAL REPORT

VOLUME TWO: APPENDICES

INDEX TO APPENDICES

APPENDIX A

1979 ON-SITE INSPECTION TEAM

INTERIM GUIDELINES, OPERATING PROCEDURES,

MEMBERSHIP, AND EVALUATION FORMS

24 April 1979

GREAT I

1979 Interim Guidelines and Evaluation for Channel Maintenance Dredging and Material Placement

INTRODUCTION

General:

The guidelines contained herein have been developed by the GREAT as an interim measure to guide the Corps of Engineers prior to the availability of final GREAT recommendations. Nothing contained herein is meant, or should be construed, to recommend actions contrary to the authorized navigation channel.

The guidelines are the recommendations of the GREAT I to the Corps (St. Paul District) for the maintenance dredging and disposal activities to be undertaken during the 1979 season. These guidelines are intended to be used only for the maintenance dredging disposal activities for the 1979 season.

Guideline Contents:

The package of material which comprises the Guidelines contains the following:

1. Guidelines and Objectives for the 1979 Season.

2. Site Specific Material Placement Recommendations.

3. Flow Chart of Dredging Season Events.

4. Procedure for On-Site Inspection of Proposed Dredged Material Placement Areas.

5. On-Site Inspection Team Assignments.

6. Dredged Material Placement Activity Report Form.

7. Material Placement Site Evaluation Form.

*8. Cost Evaluation for Dredged Material Placement Form.

9. Navigation/Commercial Transportation Evaluation Form

The Flow Chart of Dredging Season Events shows the relationship of the various events, evaluations, and decisions which are expected to occur during the 1979 dredging season. The procedures described in this chart are recommended by GREAT.

---

* This form will be used by the Material and Equipment Needs Work Group for evaluation of the Material Placement portion of the channel maintenance plans.

24 April 1979

Guidelines and Objectives
for the 1979 Season

1. Objective: Insure adequate advance notification of impending dredging.

a. General channel notices should be forwarded as soon as possible, and a phone contact made with the OSIT pay coordinator informing him of the notice and charts comm.

b. Dredging should not commence for at least 14 calendar days following transmittal of specific channel surveys to the appropriate On-Site Inspection Team.

c. If no conflict, commence dredging no sooner than 2 working days following site inspection except emergency dredging (channel depth of 10 feet). If conflict, delay all dredging until conflicts are resolved according to item D of the "1979 Procedure for On-Site Inspection of Proposed Dredged Material Areas."

2. Objective: Minimize volume of dredged material while maintaining the authorized navigation channel.

a. Dredging depths should be no greater than necessary to maintain the authorized 9-foot navigation channel based on the written recommendations of a qualified fluvial hydrologist.

b. Dredging widths should be no greater than necessary to maintain the authorized 300-foot width unless greater widths are required for navigation at bends. When widths greater than 300 feet are required at bends, the widths to be maintained should be primarily based on the most current technical information available to the District Engineer, and consideration should also be given to written recommendations of licensed tow boat operators qualified in the river area of concern.

c. Final dredging parameters for each site will be determined by the Corps of Engineers at the on-site meetings after consideration of all the recommendations received before and at the on-site meeting.

d. Detailed channel condition surveys and/or dredging should be suspended during periods of high sediment transport.

e. Utilize the realignment of channel markers as an alternative to dredging in all cases possible following Coast Guard concurrence. Proposals for reducing dredging as a result of repositioning channel markers should be brought to the attention of the Coast Guard and to licensed tow boat operators qualified in the river area of concern.

3. Objective: Place material at locations in an environmentally and economically balanced manner, using the following guidelines:

a. In every case where dredging is required, the initial effort should be to place material at a location where a beneficial use for the material can be obtained. Material should be placed in those beneficial use areas recommended by GREAT. If necessary, in order to accomplish the above objective, private sector capability should be utilized.

b. If material cannot be placed at a location where a beneficial use can be obtained, removal of dredged material from the floodplain should be given the next priority consideration at each site.

c. In instances where beneficial uses, or removal from the floodplain, cannot be accomplished, use of previous disposal areas with sand-on-sand placement should receive priority. In such cases, advance preparation of each disposal site is essential. Disposal areas will be designed for confinement of runoff water utilizing nonerosive control structures. Disposal sites should be landscaped (according to guidelines prepared by the Recreation Work Group) upon completion of the disposal operation to make the area suitable for recreational use where determined to be desirable.

d. Avoid new spoil sites developed within the boundaries of proposed wilderness areas. Spoil sites presently existing within these boundaries should not be expanded.

e. The cost of using the most apparent alternative dredging methods and disposal sites should be determined prior to the on-site meeting and made available to the On-Site Inspection Team members.

f. Attention should be given to barge and towing industry costs that would result, for example, from increased energy usage, transit time, or reduced cargo, such as may be necessitated by reduced depth dredging and/or narrower bend or channel width.

24 April 1979

SITE SPECIFIC MATERIAL PLACEMENT RECOMMENDATIONS

GREAT is currently undertaking and extensive review procedure which will lead to development of long term site specitic recommendations for dredged material placement within the study area.

The Corps of Engineers will, however, be required to undertake maintenance dredging prior to development of the site specific recommendations. The locations listed below are therefore recommended as interim dredged material disposal sites pending development of the GREAT site specific recommendations. The interim sites were selected based on the following criteria:

1. The site is non-controversial
2. The site has at some point been approved by GREAT
3. The site is within reach of existing equipment

Recommended material placement sites:

St. Anthony Falls Pool:
  A)* RM 855.6 (R)-Mpls
Pool #1:
  a) Mpls municiple coal docks
Minnesota River:
  a) RM 11.5 (R)-Burnsville
  b) RM 12.5 (R)-Burnsville
Pool #2:
  a)* Northport
  b)* Smith Ave. Bridge, RM 840.4 (R)
  c)* St. Paul Airport, RM 836.5 (R)
St. Croix River:
  none
Pool #3:
  none
Pool #4:
  a)* Wabasha-North
  b) Wabasha-South, RM 759.2 (R)-Elliot Gravel Pit
  c)* Above Read s Landing-RM 762.7 (L)
  d)* Grand Encampment-RM 756.5 (L)
  e)* Alma Boat Harbor-RM 754
Pool #5:
  a)* Above West Newton-RM 748 (R)
  b)* Above Fisher Island-RM 745.8 (R)
Pool #5A
  a) Goltz Property-RM 732 (L)

*=GREAT pursuing approval process; not approved as of 2/24/78

Pool #6:
- a) River Bend Industrial Park-Pearless Chain Co.-RM 723 (R)

Pool #7:
- a) all material to Isle La Plume (pool #8)

Pool #8:
- a) all material to Isle La Plume

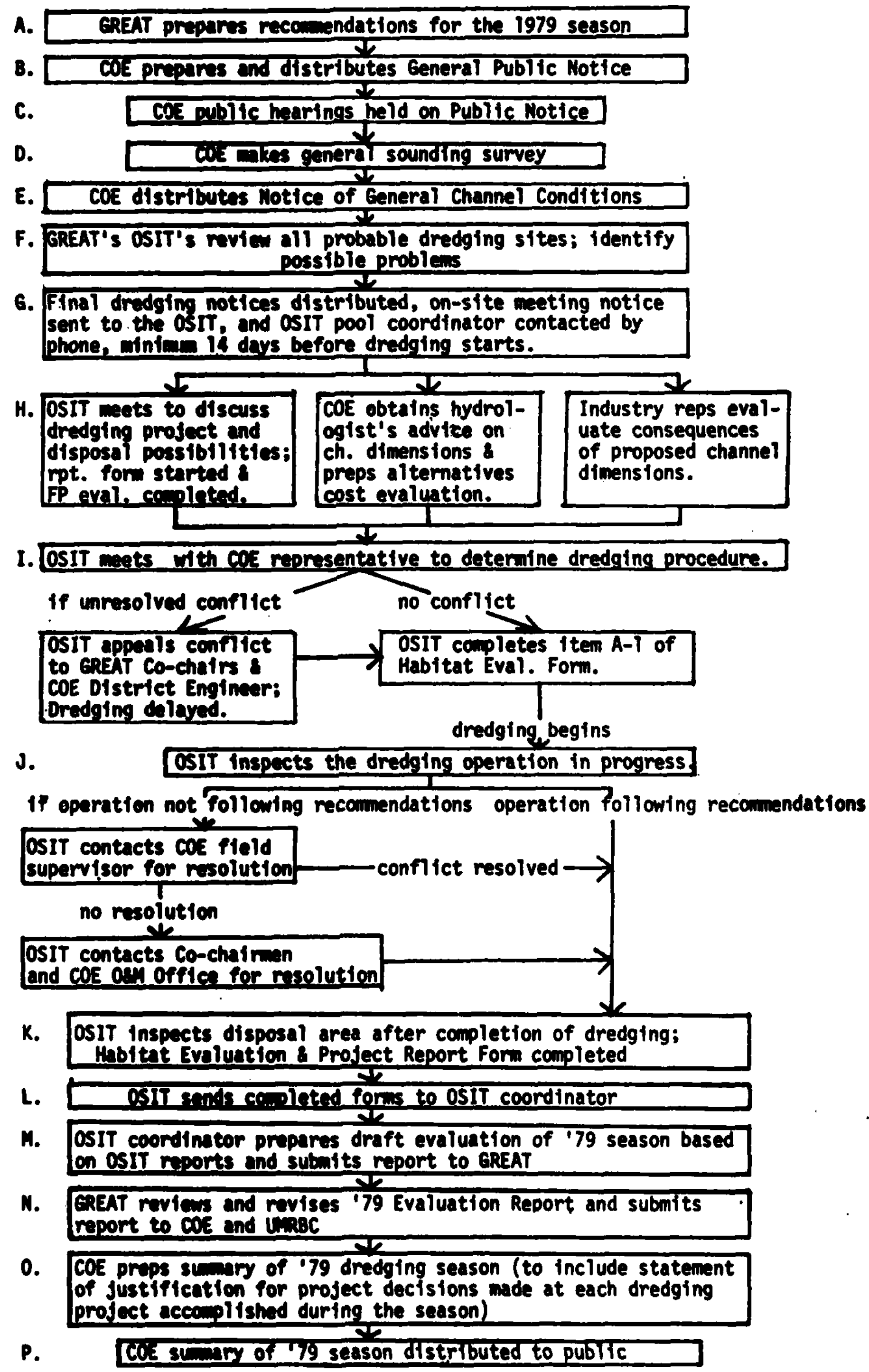
Pool #9:
- a) RM 663.0 - beneficial use site #9.03 at Lansing, Iowa
- b) RM 667.0 - beneficial use site #9.08 at DeSoto, Wisconsin

Pool #10:
- a) Wyalusing Gravel Pit - RM 623.1 (L) #10.01
- b) RM 615.6 - beneficial use site #10.02
- c) RM 615.9 - beneficial use site #10.03 at Guttenberg, IA
- d) RM 619.1 - beneficial use site #10.04
- e) RM 635.0 - beneficial use site #10.09 at Prairie du Chein, Wisconsin

24 April 1979

1979 Dredging Season

FLOW CHART OF DREDGING SEASON EVENTS



PROCEDURE FOR ON-SITE INSPECTION OF PROPOSED DREDGED MATERIAL PLACEMENT AREAS

The following procedure was created to organize and make more efficient the seasonal meetings held between field biologists and the Corps of Engineers personnel to resolve the dredged material placement conflicts common on the Upper Mississippi, Minnesota, and St. Croix Rivers. This procedure shall serve as a guideline for the meetings to be held during the 1979 dredging season.

Inherent in the procedure is the premise that all resulting recommendations and actions will be based upon the GREAT's 1979 Dredging Guidelines.

I. PROCEDURE

A. Notification -- General

General channel condition surveys (Notice of General Channel Condition) will be sent by GREAT to the pertinent On-Site Inspection Team (OSIT) as soon as available.

B. Preliminary Review

Following the receipt of the general surveys, the OSIT members from the U.S. Fish and Wildlife Service, Environmental Protection Agency, and relevant states will conduct a review of all potential dredging sites. The U.S. Fish and Wildlife Service (FWS) representative shall be responsible for organizing the review meeting and any needed site inspections.

C. Notification -- Site Specific

The GREAT will send detailed channel condition surveys (Final Dredging Notice) and an on-site inspection meeting notice to the OSIT for the given pool as soon as available, and at least 14 calendar days prior to the commencement of dredging. The GREAT will also contact the OSIT pool coordinator when the material is sent to facilitate a pre-on-site meeting by the OSIT.

D. On-Site Inspection

The OSIT and an officer from the dredge will meet to inspect the proposed dredging site, determine dredging depths and widths, select the site and method of disposal, and select a dredging method. The final dredging parameters will be determined by the Corps of Engineers representative based on the comments received.

Unresolved conflicts will be appealed immediately to the GREAT cochairmen and the District Engineer. Dredging should be delayed until the conflict is resolved. Applicable portions of the Habitat Evaluation Form will be completed during this inspection.

E. Dredging Inspection

One member of the OSIT shall inspect the dredging operation at least once to determine if the project is in compliance with the recommendations agreed upon. The FWS representative will coordinate this inspection. If the agreements reached at the on-site meeting are not being followed, the Corps field supervisor with the dredge should be notified immediately. If resolution is not achieved through the field supervisor, the OSIT representative shall immediately contact the GREAT cochairmen and the COE-O&M office.

F. Post-Dredging Evaluation

After dredging is completed, the deposition site shall be inspected by the OSIT member whose state received the dredged material. The Habitat Evaluation Form and the Dredged Spoil Placement Activity Report Form will be completed at this inspection. The completed forms shall be sent to the OSIT coordinator.

II. ON-SITE INSPECTION TEAMS

A. Team Members

The OSITs will be composed of at least five designated GREAT members each. Generally there will be one representative from the U.S. Fish and Wildlife Service, one from the U.S. Environmental Protection Agency, one from the U.S. Army Corps of Engineers and one from each of the involved states. The teams are structured with the intent of assigning responsibility for specific sites to those closest to the sites. However, this does not preclude additional representatives from attending, especially when additional expertise is needed. While the number of OSIT members is not limited, the teams should be kept to a small size and made up of local representatives, if possible. This will facilitate more time and concentration being spent on each dredging site.

August 1979

On-Site Inspection Team Assignments

B. Pool Responsibilities

Pools 1 and 2, Upper and Lower St. Anthony, and the Minnesota River

Michael Vanderford, OSIT Pool Coordinator
U.S. Fish & Wildlife Service
538 Federal Bldg.
316 N. Robert St.
St. Paul, MN 55101
(612) 725-7131

Tom Lutgen
Minn. Dept. of Natural Resources
1200 Warner Rd.
St. Paul, MN 55106
(612) 296-7523

*Louis Flynn
Minn. Pollution Control Agency
1935 W. County Road B-2
Roseville, MN 55113
(612) 296-7225

*Elmer Shannon
U.S. Environmental Protection Agency (Office of Federal Activities)
230 S. Dearborn St.
Chicago, IL 60604
FTS 353-2307

Dennis Anderson
Environmental Resources Branch
U.S. Army Corps of Engineers
U.S. Post Office & Custom House
St. Paul, MN 55101
(612) 725-5934

Pools 3 and 4 (Above Lake Pepin) and St. Croix River

Michael Vanderford, OSIT Pool Coordinator
U.S. Fish & Wildlife Service
538 Federal Bldg.
316 N. Robert St.
St. Paul, MN 55101
(612) 725-7131

*Louis Flynn
Minn. Pollution Control Agency
1935 W. County Road B-2
Roseville, MN 55113
(612) 296-7225

---

* Should send notices, not necessary to send sounding charts.

Bruce Hawkinson
Minn. Dept. of Natural Resources
P.O. Box 69
Lake City, MN 55401
(612) 345-4219

David Kennedy
Wisc. Dept. of Natural Resources
State Office Bldg.
3550 Mormon Coulee Road
La Crosse, WI 54601
(608) 785-9000

If Kennedy is not in, speak with
1) Willis Fernholz
2) Jim Holzer
3) Tom Lovejoy

*Elmer Shannon
U.S. Environmental Protection Agency (Office of Federal Action)
230 S. Dearborn St.
Chicago, IL 60604
FTS 353-2307

Dennis Anderson
Environmental Resources Branch
U.S. Army Corps of Engineers
U.S. Post Office & Custom House
St. Paul, MN 55101
(612) 725-5934

Pools 4 (Below Lake Pepin) and 5

James Clapp, OSIT Pool Coordinator
U.S. Fish & Wildlife Service,
Route 1
Trempealeau, WI 54661
(608) 539-2311

Bruce Hawkinson
Minn. Dept. of Natural Resources
P.O. Box 69
Lake City, MN 55401
(612) 345-4219

Nick Gulden
Minn. Dept. of Natural Resources
305 Exchange Bldg.
Winona, MN 55987
(507) 457-2196

*Larry Landher
Minn. Pollution Control Agency
821 Third Avenue S.E.
Rochester, MN 55901
(507) 285 7343

----
* Should receive notices, not necessary to send sounding charts.

*Elmer Shannon
U.S. Environmental Protection Agency (Office of Federal Action)
230 S. Dearborn St.
Chicago, IL 60604
FTS 353-2307

*Carl Pospichal
U.S. Fish & Wildlife Service
Upper Mississippi River Wild Life & Fish Refuge
122 W. Second Street
Winona, MN 55987
(507) 452-4232

*David Kennedy
Wisc. Dept. of Natural Resources
State Office Bldg.
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

If Kennedy is not in, speak with
1) Willis Fernholz
2) Jim Holzer
3) Tom Lovejoy

Ron Nicklaus
Wisc. Dept. of Natural Resources
State Office Bldg.
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Robert Whiting
Environmental Resources Branch
U.S. Army Corps of Engineers
U.S. Post Office & Custom House
St. Paul, MN 55101
(612) 725-5934

Pools 5A and 6

James Clapp, OSIT Pool Coordinator
U.S. Fish & Wildlife Service
Route 1
Trempealeau, WI 54661
(608) 539-2311

Nick Gulden
Minn. Dept. of Natural Resources
305 Exchange Bldg.
Winona, MN 55987
(507) 457-2196

*Larry Landher
Minn. Pollution Control Agency
821 Third Avenue S.E.
Rochester, MN 55901
(507) 285-7343

---

* Should receive notices, not necessary to send sounding charts.

*Elmer Shannon
U.S. Environmental Protection Agency (Office of Federal Action)
230 S. Dearborn St.
Chicago, IL 60604
FTS 353-2307

*Carl Pospichal
U.S. Fish & Wildlife Service
Upper Mississippi River Wild Life & Fish Refuge
122 West Second St.
Winona, MN 55987
(507) 452-4232

Bruce Hawkinson
Minn Dept. of Natural Resources
P.O. Box 69
Lake City, MN 55401
(612) 345-4219

Ron Nicklaus
Wisc. Dept of Natural Resources
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608)785-9000

David Kennedy (or Fernholz or Holzer or Lovejoy)
Wisc. Dept. of Natural Resources
State Office Bldg.
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Dennis Anderson
Environmental Resources Branch
U.S. Army Corps of Engineers
U.S. Post Office & Custom House
St. Paul, MN 55101
(612) 725-5934

Pools 7 and 8

John Lindell, OSIT Pool Coordinator
U.S. Fish & Wildlife Service
P.O. Box 415
La Crosse, WI 54601
(608) 782-6039 (answering service); FTS 364-4210

Nick Gulden
Minn. Dept. of Natural Resources
305 Exchange Bldg.
Winona, MN 55987
(507) 457-2196

---

* Should receive notices, not necessary to send sounding charts.

*Larry Landher
Minn. Pollution Control Agency
821 Third Avenue S.E.
Rochester, MN 55901
(507) 285-7343

*Elmer Shannon
U.S. Environmental Protection Agency (Office of Federal Action)
230 S. Dearborn St.
Chicago, IL 60604
FTS 353-2307

Dennis Anderson
Environmental Resources Branch
U.S. Army Corps of Engineers
U.S. Post Office & Custom House
St. Paul, MN 55101
(612) 725-5934

*Carl Pospichal
U.S. Fish & Wildlife Service
Upper Mississippi River Wild Life & Fish Refuge
122 West Second St.
Winona, MN 55987
(507) 452-4232

*David Kennedy (or Fernholz or Holzer or Lovejoy)
Wisc. Dept. of Natural Resources
State Office Bldg.
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Ron Nicklaus
Wisc. Dept. of Natural Resources
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Bruce Hawkinson
Minn. Dept. of Natural Resources
P.O. Box 69
Lake City, MN 55401

Pool 9

Donna Rasmussen
OSIT Pool Coordinator
U.S. Fish & Wildlife Service
P.O. Box 130
Lansing, IA 52151
Office (319) 533-4580
Home (608) 734-3604

*Jim Webb, Director
Natural Resources Council
Wallace State Office Building
E. 9th and Grand
Des Moines, Iowa 50319
(319) 281-5914

---

* Should receive notices, not necessary to send sounding charts.

Mark Ackelson
Iowa Conservation Commission
Wallace State Office Bldg.
East 9th & Grand St.
Des Moines, IA 50319
Office (319) 252-1156
Home (319) 252-2139

Gary Ackerman
Iowa Conservation Commission
317 River Park Drive N.
Guttenberg, Iowa 52052
Office (319) 252-1156
Home (319) 252-2139

*Joe Ober/Larry Crane
Dept. of Environmental Quality
Wallace State Office Building
E. 9th and Grand St.
Des Moines, Iowa 50319
(319) 281-5011

Jim Ripple
Iowa Conservation Commission
911 South Mill Street
Decorah, IA 52101
Office (319) 382-4895
Home (319) 568-2767

*Nick Gulden
Minn. Dept. of Natural Resources
305 Exchange Bldg.
Winona, MN 55987
(507) 457-2196

*Elmer Shannon
U.S. Environmental Protection Agency
(Office of Federal Action)
230 S. Dearborn St.
Chicago, IL 60604
FTS 353-2307

Bruce Hawkinson
Minn. Dept. of Natural Resources
P.O. Box 69
Lake City, MN 55401
(612) 345-4219

Ron Nicklaus
Wisc. Dept. of Natural Resources
3550 Nornom Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Larry Moore
Iowa Conservation Commission
Box 15A
Harper's Ferry, Iowa 52146
(319) 586-2464

*Carl Pospichal
U.S. Fish & Wildlife Service
Upper Mississippi River Wild Life & Fish Refuge
112 West Second St.
Winona, MN 55987
(507) 452-4232

*David Kennedy (or Fernholz or Holzer or Lovejoy)
Wisc. Dept. of Natural Resources
State Office Bldg.
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Dennis Anderson
Environmental Resources Branch
U. S. Army Corps of Engineers
U. S. Post Office & Custom House
St. Paul, MN 55101

---

* Should receive notices, not necessary to send sounding charts.

Pool 10

John Lyons or Michael Tansy
OSIT Pool Coordinator
U.S Fish & Wildlife Service
P.O. Box 27
Cassville, WI 53806

Mark Ackelson
Iowa Conservation Commission
Wallace State Office Building
E. 9th & Grand
Des Moines, Iowa 50319
Off (515) 281-8674
Home (515) 262-0015

Gary Ackerman
Iowa Conservation Commission
317 River Park Drive N.
Guttenberg, IA 52052
Office (319) 252-1156
Home (319) 252-2139

Jim Ripple
Iowa Conservation Commission
911 South Mill Street
Decorah, IA 52101
Office (319) 382-4895
Home (319) 568-2767

*Carl Pospichal
U.S. Fish & Wildlife Service
Upper Mississippi River Wild Life & Fish Refuge
122 West Second Street
Winona, MN 55987
(507) 452-4232

*Elmer Shannon
U.S. Environmental Protection Agency (Office of Federal Action)
230 S. Dearborn St.
Chicago, IL 60604
FTS 353-2307

*David Kennedy (or Fernholz or Holzer or Lovejoy)
Wisc. Dept. of Natural Resources
State Office Bldg.
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Ron Nicklaus
Wisc. Dept. of Natural Resources
3550 Mormon Coulee Rd.
La Crosse, WI 54601
(608) 785-9000

Stan Blair
Iowa Conservation Commission
P. O. Box 429
Guttenberg, IA 52052
(319) 252-3663

*Joe Ober/Larry Crane
Dept. of Environmental Quality
Wallace State Office Building
E. 9th and Grand
Des Moines, Iowa 50319
(515) 281-5011

*Jim Webb, Director
Natural Resources Council
Wallace State Office Building
E. 9th and Grand
Des Moines, Iowa 50319
(515) 281-5914

Dennis Anderson
Environmental Resources Branch
U.S. Army Corps of Engineers
U.S. Post Office & Custom House
St. Paul, MN 55101
(612) 725-5934

---

* Should receive notices, not necessary to send sounding charts.

SPECIAL CONTACTS (Send notice for all pools)

##Michael J. Vanderford, OSIT Coordinator
U.S. Fish & Wildlife Service
538 Federal Bldg.
316 N. Robert St.
St. Paul, MN 55101
Office (612) 725-7131
Home (612) 827-6815

**Wayne A. Knott, GREAT CO-Chairman
U.S. Army Corps of Engineers
1530 U.S. P.O. & Custom House
St. Paul, MN 55101
Office (612) 725-5942 (FTS & Comm.)
Home (612) 739-2724

**John P. Wolflin, GREAT Co-Chairman
U.S. Fish & Wildlife Service
530 Federal Bldg.
316 N. Robert St.
St. Paul, MN 55101
Office (612) 725-7641
Home (612) 929-8655

**Daniel Krumholz, COE Dredging Coordinator
U.S. Army Corps of Engineers (CO-MA)
Operations & Maintenance Office
U.S. P.O. & Custom House
St. Paul, MN 55101
Office (612) 725-7544 (FTS & Comm.)

*James Harrison
MN-WI Boundary Area Commission
619 Second Street
Hudson, WI 54016
Wisc. No.: (715) 386-9444
Twin Cities No. (612) 436-7131

***Dan McGuiness
GREAT Public Participation Coordinator
149 Main Street
Wabasha, MN 55981
Office (612) 565-3484
Home (612) 565-4308

*LCDR Richard Walton
U.S. Coast Guard
1520 Market Street
St. Louis, MO 63103
(314) 279-4620

**Ronald Mustard
Region 5
Environmental Protection Agency
230 S. Dearborn Street
Chicago, IL 60604
(312) 353-2307

**Richard Lambert
Twin City Barge & Towing Company
1303 Red Rock Road
St. Paul, MN 55165
Office (612) 735-5440
24 hrs (612) 224-0043

***Lonnie Jacobs
American Waterways Operators
11 S. Meramec Ave., #1312
Clayton, MO 63105
(314) 862-4080

- - - - - -

* Should receive notices, not necessary to send sounding charts.
*** Send notices and charts for all sites.
\## Send notices and charts for all sites below Lake Pepin.
** Don't send notices or charts.

GREAT RIVER ENVIRONMENTAL ACTION TEAM

1978 DREDGED MATERIAL DISPOSAL PLACEMENT ACTIVITY
REPORT FORM

Note: This form should be completed as much as possible during or immediately after the preliminaty and on-site meetings for each dredging project. This is a simple way of dicumenting each project and any resulting spoil disposal. We ask that you make every effort to complete the form and return it to the coordinator of the On-Site Inspection Teams-

I. Dredging Site Information:
 Name of Site______________________________
 Pool and River Mile______________________________

II. Notification (General):
 This site included in general notification as probable dredging site:
 Yes______ No______
 Advance Notice Attached - Yes______ No_____ Date of Notice__________

III. Preliminary Review
 A. Meeting Date______________19__ In-field? Yes_____ No______
 Participants:
 1)
 2)
 3)
 4)
 5)
 B. Other sites considered in this meeting:

 C. Is approved central stockpile site available? Yes_____ No_____
 If yes, location:

 Distance from dredging site: __________miles

 D. Disposal Sites Considered -
 Site #1 - Name______________________, River mile_______, Bank side____
 Owner:
 Suitability for disposal: Suitable______ Not Suitable______
 Reasons: (May reference habitat evaluation form)

Site #2 - Name ____________________, River mile ________, Bank side _____
Owner:
Suitability for disposal: Suitable _____ Not Suitable _____
Reasons:

Site #3 - Name ____________________, River mile ________, Bank side _____
Owner:
Suitability for disposal: Suitable _____ Not Suitable _____
Reasons:

Site #4 - Name ____________________, River mile ________, Bank side _____
Owner:
Suitability for disposal: Suitable _____ Not Suitable _____
Reasons:

(Use other side for additional site descriptions)

IV. Notification-Site Specific:
Detailed dredging notice: Date _________________
On-site meeting scheduled: Yes _____ No _____ Date _______________
Other sites included in this notice:

V. On-Site Inspection:
Meeting date _______________, Location _________________________________
On-site team members for this site:
a. Minnesota
b. Wisconsin
c. Iowa
d. U.S. Fish and Wildlife Service
e. U.S. Environmental Protection Agency
f. U.S. Army Corps of Engineers
g. Public

A. Corps of Engineers Proposals:
   Projected Dredging Depth_________________ Width_______________
   Justification provided for depth and width dredged - Yes____ No_____
      a. What form of justification provided?

      b. Was justification adequate - Yes______ No______
         If No, why not?

Projected Volume________________
Sketch of Proposed Dredging Site - Showing proximity to proposed
  disposal site:

Proposed Disposal Area:
  River Mile__________, Bank Side_______________
  Sketch of area: (Include nearby side channels and sloughs)

Will material be beneficially used? Yes______ No______
Advance preparation of disposal site proposed: Yes______ No______
Dike construction: Yes______ No_______
Other:

Proposed Dredging Method:
Dredge to be used:
Was booster pump used: Yes______ No______
Double Pumping? Yes______ No______
Will Material be Barged: Yes______ No______ How Far?________miles
Other Comments

B. Any comments or advice from special contacts (Coast Guard, barge industry, etc.)? Yes_____ No______
Where they on site?_____ Comments:

C. Recommendations of On-Site Inspection Team
Dredging Depth______ Dredging Width________
Reasons:

Disposal or Stockpile Site: Location - River mile______, Bank side____
Sketch of Site:

Benefits of Site over other sites

Recommended Impact Abatement Measures:

Is there any pilot project or special study associated with this project? Yes_____ No_____
If yes, explain what are special conditions.

D. Unresolvable Conflicts: Yes______ No______
Give details of conflicts:

Were cochairmen and District Engineer contacted? Yes_____ No_____
Response:

VI. Dredging Inspection and Post Dredging Evaluation
Location of spoil placement:
(River mile, right or left descending bank, county, state)

A. Corps Attempted to Minimize Dredge Material Volume: Yes_____ No______
Final Volume_________________
If Yes, by what means:
1. Reduced overdepth dredging - Yes_____ No_____
dredging depth________________
2. Stayed within width limit - Yes______ No______ Width_______
3. Discontinued dredging on high water - Yes_____ No______
4. Change channel markers and channel alignment - Yes_____ No_____
5. Other (comments)

B. Dredge Material Was Put to Beneficial Use: Yes_____ No_____
If yes,
1. Area recommended by GREAT - Yes_____ No_____
2. Private contractor used - Yes_____ No______
3. Other (comments)

Where placed:

Who owns land:
Material use:

Where used:

C. Corps Attempted to Avoid Environmental Degradation Resulting from the Dredge Material Deposition By:

1. Removal from flood plain - Yes______ No______
2. Advance preparation - Yes______ No________
   What kind and extent?

3. Stabilization of dredged material - Yes________ No________
   How?

4. Containment - Yes_______ No______
   Did it hold volume dredged?

5. Direction of return flow:

6. Drop structure used - Yes______ No______

7. Silt curtain - Yes______ No______

8. Other (comments)

VII. Summary of Any Failures to Comply with Recommendations of On-Site Inspection Team:

GREAT RIVER ENVIRONMENTAL ACTION TEAM

1978 SPOIL DISPOSAL SITE EVALUATION FORM

To be used with the 1978 dredged material placement activity report form.

Note: This portion of the 1978 Report Form should be completed after a spoil disposal site has been selected by the On-Site Inspection Team. After completion, it should be sent with the Report Form to the coordinator of the On-Site Inspection Teams.

A. Dredging Site Name:

B. Site Location:

C. On-Site Inspection Team Members for Site:

a. Iowa
b. Minnesota
c. Wisconsin
d. U. S. Fish and Wildlife Service
e. U. S. Environmental Protection Agency
f. U. S. Army Corps of Engineers
g. Public
h. Others

D. Approximate Acreage of Land Proposed for Receiving Dredged Material:

E. Sketch of Proposed Receiving Area (Show approximate area to be covered by spoil as well as the river bank, surrounding wetlands, old spoil, woodlands, etc. Also indicate location of any attached photographs):

F. Habitat Acreage Which Would Be Directly Affected By Spoil Placement and Percent of Receiving Area By Type:

1. Terrestrial
   a) old spoil__________%; estimated acres____________________
   b) bare sand bar_______%; estimated acres________________
   c) sand bar with vegetative growth (less than 50%)__________%; estimated acres_____________
   d) willow stands, some open sand__________%; estimated acres ______________
   e) bottomland hardwoods__________%; estimated acres_______________
   f) aquatic or semi-aquatic plant communities_____________%; estimated acres___________
   g) known wildlife uses of area:

2. Aquatic habitat (UMRCC Habitat Classification)
   a) main channel__________%; estimated acres____________
   b) channel border________%; estimated acres____________
   c) tail waters___________%; estimated acres____________
   d) side channels_________%; estimated acres____________
   e) river lakes and ponds___________%; estimated acres_____________
   f) sloughs_________%; estimated acres________________
   g) riprap and wing dams: ___________feet affected; How?___________ ____
   h) known fish and wildlife uses of area:

G. Probable Indirect Effects of Spoil Placement (What Effect, When and How?):

1. On terrestrial habitat:

2. On aquatic habitat:

3. On recreational resources:

H. Special Features or Importance of Area Which Would Be Directly or Indirectly Affected:

I. Signs of Biological Problems in the Area:

J. General Comments on Biological Value of Area:

K. Floodplain Encroachment:
Is site in the 100-year floodplain (1965 flood)? yes____ no____
Is site in the floodway? yes____ no____

24 April 1979

1979 Dredging Season

COST EVALUATION FOR DREDGED MATERIAL PLACEMENT FORM

To be completed by a representative of the Materials and Equipment Needs Work Group.

1. The Material and Equipment Needs Work Group intends to evaluate cost of dredging operations for each material placement plan. Sufficient background information on energy usage on which to base assumptions has not been assembled. The basic output of our analysis will be displayed on tables (format attached).

2. As of now, we plan to estimate only five dredging methods. If the need arises, more can be added later.

3. A similar format and analysis will be used to provide dredging costs for the on-site inspection teams.

4. The following analysis and comparisons will be made between placement plans and dredging methods:

a. Determine the most cost effective means of dredging at each cut and corresponding disposal site.

b. Determine the most cost effective dredging method for a pool within each placement category.

c. Determine the most cost effective category within a pool for each dredging method.

d. Determine the most cost effective set of disposal sites, regardless of placement category, within a pool for each dredging method.

e. Determine the most cost effective dredging method for the GREAT I study area within each placement category.

f. Determine the most cost effective category for each dredging method for the GREAT I area.

g. Determine the most cost effective set of disposal sites, regardless of placement category, for each dredging method covering the GREAT I study area.

DREDGING COST ESTIMATES FOR POOL (X)

(All costs are average annual 1979 $ based on 6-5/8 percent discount rate)

Dredging Cut	Most Probable Future Without GREAT (1986-2025)	Selective Placement	Regional Placement	Beneficial Use	Centralized	Habitat Enhancement	Removal from Floodplain
(Name of cut)	(Thompson cost)	$____	$____	$____	$____	$____	$____
	(Hauser cost)	____	____	____	____	____	____
	(Mud Cat cost)	____	____	____	____	____	____
	(Pneuma Pump cost)	____	____	____	____	____	____
	(Dubuque cost)	____	____	____	____	____	____
____	$____	$____	$____	$____	$____	$____	$____
	____	____	____	____	____	____	____
	____	____	____	____	____	____	____
	____	____	____	____	____	____	____
	____	____	____	____	____	____	____
____	$____	$____	$____	$____	$____	$____	$____
	____	____	____	____	____	____	____
	____	____	____	____	____	____	____
	____	____	____	____	____	____	____
	____	____	____	____	____	____	____

24 April 1979

1979 NAVIGATION/COMMERCIAL RIVER TRANSPORTATION EVALUATION FORM

To be used in evaluating the Corps of Engineers' 197 Channel Maintenance Dredging and Disposal Program. To be completed by representatives of the U.S. Department of Transportation or the barging industry.

Baseline Information:

A. Most recent channel soundings in area of the proposed dredge cut location:

1) Attach a chart(s) showing soundings (navigation chart(s) preferred)

Chart(s) attached: ____________ Yes ____________ No

2) Date(s) of soundings: ______________________________

B. Proposed dredging/disposal

1) Attach a chart(s) showing proposed dredge cut and disposal site (navigation chart(s) preferred)

Chart(s) attached: ____________ Yes ____________ No

2) Proposed dredging/disposal date(s): ______________

3) Proposed dredging operation:

a. Location (pool/river mile(s)) ____________
b. Depth (feet) ____________
c. Estimated volume (cu.yards) ____________
d. General description of proposed dredging operation (e.g., type of dredge):

4) Proposed disposal operation:

a. Location(s) (pool/river mile(s)) ____________
b. Distance from dredge cut (yards) ____________
c. Max height of disposal site (feet) ____________
d. General description of proposed disposal operation (e.g., site preparation, containment):

C. Most recent dredging/disposal at same (proposed) dredge cut location:

1) Date(s) of most recent dredging/disposal ____________

2) Depth of most recent cut (feet) ____________

3) Volume (cu. yards) ____________

4) Location of disposal site (pool/river mile(s)) ____________

5) Distance of disposal site from dredge cut (yards) ____________

I. Pre-dredging/disposal evaluation:

A. Dredging:

1) Navigation point of view

a. Does the general area of the proposed dredge cut have a history of sudden, rapid reduction in channel depth?

____________ Yes ____________ No

If yes, explain.

b. If the proposed dredging is accomplished, how will the resulting channel depth differ from the depth after the most recent dredging?

(The new depth will be)

____________ Shallower ____________ Same Depth

____________ Deeper

c. Have any groundings by commercial river transportation at the proposed dredge cut been reported to the Corps of Engineers since the most recent dredging?

____________ Yes ____________ No

If yes, describe all such reports. In particular, for each report, attempt to provide the following information:

Date of report ____________

Date of grounding ____________

Reported by (person/company) ____________

Damage (general description and/or cost) ____________

Time vessel delayed (hours) ____________
Soundings taken after incident ____________ Yes ____________ No

If yes, Date ____________
Depth ____________

Draft of vessel(s) ____________

Comments on actions taken by COE after grounding:

d. If the proposed channel depth after the proposed dredging will be shallower or the same as the depth after the most recent dredging, and if groundings (because of channel depths less than 9 feet) have occurred at the proposed dredge cut since the most recent dredging, what is the Corps of Engineers' justification for not increasing the depth in order to reduce the risk of additional groundings?

e. Have any complaints or incidents been reported to the COE since the most recent dredging such that the channel/bend width or configuration is or may be inadequate for proper navigation? ____________ Yes ____________ No

If yes, describe all such reports, or incidents. In particular, for each report, attempt to provide the following information:

Date of report ____________
Reported by (person/company) ____________
Nature of complaint/incident ____________

Comments on actions taken by COE in response to complaint/incident:

f. Is the proposed dredge cut located on a bend?
____________ Yes ____________ No

If yes, did the COE survey licensed tow operators who are experienced in the area of concern to determine whether the existing and the proposed bend widths are adequate for proper navigation? ____________ Yes ____________ No
____________ Not Applicable

If yes, name the operators surveyed and describe the results of the survey.

If no, what is the COE's justification for not conducting the survey?

g. If the proposed dredging is accomplished, will the resulting navigation channel infringe on existing or proposed barge fleeting areas? ____________ Yes ____________ No

If yes, briefly describe the infringement and the COE's reasons for why such infringement is necessary or desirable.

h. If the proposed dredging is accomplished, will the resulting channel characteristics change the river's flow characteristics so as to impede navigation, to undermine structural foundations, or to impair the placement and/or stationkeeping of aids to navigation?
____________ Yes ____________ No

If yes, briefly explain.

i. Comparing the channel which existed after the most recent dredging with the channel that would result if the proposed dredging is accomplished, will the hazards to the safety of life and property be changed–e.g., due to increased risk of grounding or collision?
____________ Increased hazards ____________ No change
____________ Decreased hazards

Briefly explain:

2) Economic point of view

a. If the proposed dredging is accomplished, will the resulting channel characteristics involve navigation-related costs that are greater than would have existed prior to CREAT. (Note–For the purposes of this item, navigation

costs should be considered to be those due to increased tow energy usage, increased tow transit time, or reduced tow cargo such as might result from reduced depths and/or reduced channel or bend widths.)

__________ Yes __________ No

If yes, briefly explain and quantify if possible.

b. (See item II-c wherein dredging and disposal costs to the COE are considered together.)

B. Disposal

1) Navigation point of view

a. Will the proposed disposal site physically impede navigation-e.g., by obstructing necessary tow maneuvering space or visibility? __________ Yes __________ No

If yes, briefly explain.

b. Will the proposed disposal site infringe on existing or proposed barge fleeting or terminal areas?

__________ Yes __________ No

If yes, briefly explain.

c. Will the proposed disposal site change the river's flow characteristics so as to impede navigation, to undermine structural foundations, or to impair the placement and/or stationkeeping of aids to navigation?

__________ Yes __________ No

If yes, briefly explain.

d. Will the proposed disposal site pose a navigation-related hazard to the safety of life and property not covered by the above items? __________ Yes __________ No

If yes, briefly explain.

2) Economic point of view (See item II-c wherein dredging and disposal costs to the COE are considered together.)

C. Corps of Engineers' costs-(Notes (1) A similar item may be included in another evaluation form titled, Dredging and Disposal Alternatives Cost Evaluation Form. (2) This item has been included in the Navigation/Commercial River Transportation evaluation because of pending legislation whereby shallow draft navigation may be required to pay directly for channel operation, maintenance and new facilities. If such payments are required, this item is of obvious major, direct interest to Navigation/ Commercial River Transportation interests. If such payments are not required, this item should be evaluated by the COE or public interest groups.)

1) COE dredging costs-Will the proposed dredging operation involve COE-related costs that are greater than would have existed prior to GREAT I? ____________ Yes ____________ No

If yes, explain. Itemize and quantify if possible.

2) COE disposal costs-Will the proposed disposal operation involve COE-related costs that are greater than would have existed prior to GREAT I? (Note-For the purpose of this item COE-related costs should be considered those for land use acquisition, dredged material transportation, and site preparation/maintenance.) ____________ Yes ____________ No

If yes explain. Itemize and quantify if possible.

3) Estimated total COE cost of dredging disposal operation (dollars) ________________

4) Estimated total COE cost per cubic yard (dollars) ________________

D. Recommendations for changes to proposed dredging operation (include justification/rationale for each recommendation):

E. Recommendations for changes to proposed disposal operation (include justification/rationale for each recommendation):

F. Miscellaneous comments:

I. Post-dredging/disposal evaluation:

A. Dredging-Were the recommendations of II-D incorporated?
____________Yes ____________No

If no, explain.

B. Disposal-Were the recommendations of II-E incorporated?
____________Yes ____________No

If no, explain.

C. Total COE cost of dredging/disposal operation (dollars) ____________

D. Total COE cost per cubic yard (dollars) ____________

E. Recommended changes to evaluation form:

F. Miscellaneous comments:

APPENDIX A1

ON-SITE INSPECTION TEAM

OPERATING PROCEDURES, MEMBERSHIP, AND EVALUATIONS FORM

AFTER THE GREAT-I CONCLUDES

GUIDELINES FOR NOTIFICATION AND COORDINATION
OF MISSISSIPPI RIVER CHANNEL MAINTENANCE PROJECTS
IN THE ST. PAUL DISTRICT

I. INTRODUCTION.

During the term of the Great River Environmental Action Team I (GREAT I), a procedure was developed to coordinate decision making and actions of the Corps of Engineers regarding maintenance dredging of the Mississippi, Minnesota, and Saint Croix Rivers. The procedure gave the Fedral and State natural resource management agencies direct input into the Corps decision making process. The procedure also gave the Corps immediate feedback from these agencies on dredging projects and facilitated resolution to problems when present. The procedure involved the use of On-Site Inspection Teams (OSIT's) for each dredging event.

The guidelines contained in this document describe the OSIT procedure to be used in the future. They are to provide for notification and coordination of Mississippi River channel maintenance projects beginning with the 1980 dredging season. The guidelines are consistent with the recommendations of GREAT I. It is understood that the Corps of Engineers will obtain necessary permits from State and Federal regulatory agencies. The guidelines should also be used to implement the GREAT I Interim Channel Maintenance Guidelines (1980-1985) and Long-Term Channel Maintenance Plan (1985-2025).

To ensure the success of the GREAT I channel maintenance plan and these guidelines, the Corps should immediately take actions to implement the GREAT I dredged material placement plans and recommendations. These actions include implementing immediately those recommendations that are within present funding and equipment constraints, seeking funds where necessary, and developing those recommendations needing further work.

II. OSIT PARTICIPATION.

Dredging projects on the Mississippi, Minnesota, and Saint Croix Rivers affect resources that several agencies and interests are charged with managing. Therefore, the OSIT participants should include representatives of:

1. U.S. Army Corps of Engineers
2. U.S. Fish and Wildlife Service
3. U.S. Environmental Protection Agency
4. U.S. Coast Guard
5. Minnesota Pollution Control Agency
6. Minnesota Department of Natural Resources
7. Wisconsin Department of Natural Resources

8. Iowa Conservation Commission

9. Iowa Natural Resources Council

10. Iowa Department of Environmental Quality

11. Lower St. Croix Management Commission

12. Regional conservation and/or hunting and fishing organizations

These agencies and organizations are suggested based on past participation in the GREAT I on-site inspection process, vested interest in Corps activities, and regulatory functions governing material placement. Other agencies have interests and concerns in channel maintenance operations. These agencies will be coordinated with as necessary or are invited to join in active participation on the on-site inspection team.

The representation of the agencies on the OSIT will change from the approach used during the term of GREAT. Each agency on the OSIT will have one or two primary representatives for the entire Saint Paul District. These representatives may call on local agency staff to provide specific knowledge of an area, but the primary representative(s) will set the final policy for his or her agency.

For OSIT assignments, the District will be divided into two regions. One region is the portion upstream of Lake City, Minnesota (Cairo mile 733.0), and includes the Minnesota and Saint Croix Rivers. The second region includes the Lake City small-boat harbor and that portion of the District downstream to Guttenberg, Iowa. Participating organizations should designate a coordinator and one alternate for each region or preferably one coordinator to serve both regions if possible. This will allow the OSIT to provide imput to the Corps on the priority and allocation of equipment to meet dredging and disposal needs for the District.

Participating agencies should notify the Saint Paul District's Dredging Coordinator by April 15 of each year to designate their primary OSIT coordinator(s). A secondary agency contact should also be designated at this time.

III. OSIT FUNCTION.

1. Dredging and Dredged Material Placement Decisions

The On-Site Inspection Team's function will be to provide input and guidance to the Saint Paul District for making dredging and dredged material placement decisions. The OSIT will determine and recommend how to best implement the GREAT I dredged material placement plan for any given dredge cut. The District's Dredging Coordinator will present the final OSIT dredging disposal recommendation to the District for a final decision.

In cases where placement site design or special safeguards needed to protect wetlands are in question, the OSIT will serve as the primary advisor to the coordinator. In these cases, the OSIT will also serve as the avenue for expressing agency regulatory requirements.

2. Appealing Decisions.

The OSIT will also serve as a means for the natural resource agencies to jointly appeal to the District Engineer the Corps intended action. The OSIT's appeal function will provide an opportunity for legitimate questions to be further investigated and documented.

The appeal process will begin when a majority of the OSIT members (one vote per state or federal agency) vote to appeal a decision of the District. The Fish and Wildlife Service OSIT representative will notify the District Engineer of this appeal immediately by telephone and set a date approximately one week later for a hearing by the District Engineer. The District Engineer will be further informed during the telephone call of the specific items being appealed. If possible, the COE should postpone any dredging action under appeal until the conclusion of this hearing.

The Fish and Wildlife Service OSIT representative will coordinate the development of the appeal case and materials to present to the District Engineer, with all OSIT members having an opportunity to fully participate in the development. The OSIT will select a member of the team to make the presentation to the District Engineer, and possibly recommend the presence of specific agency chiefs at the hearing.

The hearing before the District Engineer will provide for the OSIT to make a full presentation of its case, and the COE's Operation and Maintenance Branch to provide response. After an open discussion period the District Engineer will make a final decision on the appeal subject or postpone a decision pending the gathering of more information. The District Engineer's decision at the conclusion of the hearing will conclude the appeal process.

3. Annual Evaluation.

The OSIT will also be responsible for preparing an evaluation of each year's dredging season. This evaluation will represent the OSIT's perception of the COE's efforts to achieve the CMP. The evaluations may further contain recommendations to modify the CMP or the COE's methods of accomplishing the CMP. The Fish and Wildlife Service representative of the OSIT will be responsible for coordinating the development of the annual evaluation, having January 15 as the deadline for completing and distributing the document.

IV. ON-SITE INSPECTION TEAM (OSIT) PROCEDURE FOR DREDGING AND MATERIAL PLACEMENT DECISIONS

A.	1 February	C of E distributes general Public Notice for 30-day review period. Public hearings are held during this period.
B.	1 March	C of E prepares a Determination and Findings Statement from comments in response to the Public Notice.
C.	Mid-April	General channel soundings are initiated followed by detailed hydrographic surveys.
D.	Two Weeks Before Dredging	Channel maintenance dredging is determined necessary. OSIT is notified and dredging prints are released for review.
E.		Dredging and placement site alternatives are identified and evaluated from floodplain, environmental, and operational perspectives. A hydraulic evaluation of the shoaled area is prepared.
F.	One Week Before Dredging	The OSIT meets with C of E representative to review dredging proposal for consistency with the GREAT I channel maintenance plan, determine appropriate safeguards required and develop a recommendation.

Unresolved conflict between OSIT and C of E representative.

No conflict.

G.		OSIT appeals conflict to District Engineer for resolution. District Engineer makes final decision. → OSIT prepares an evaluation of habitat to be affected by material placement.
H.	Dredging	Dredging is conducted. OSIT inspects operation for conformance to recommended plan.
I.	After Dredging	OSIT inspects placement site and prepares an evaluation of dredging project and habitat impacts.
J.	1 December	OSIT prepares and sends to the District Engineer and agency heads an evaluation of dredging project and habitat impacts.
K.	15 December	C of E prepares and distributes season summary.

Corps of Engineers Obtains Necesary Permits From State and Federal Regulatory Agencies

Saint Paul District
On-Site Inspection Team Report Form
for Dredging and Dredged Material Placement Activities
on the Mississippi, Minnesota, and Saint Croix Rivers

NOTE: This report should be completed for each dredging or dredging related project commenced by the Saint Paul District Corps of Engineers. The reports are to be used to document the environmental impacts of maintenance dredging subsequent to the GREAT I program.

A. Dredge Cut Name:

B. Disposal Site Location:

R.M.______________ Pool______________ GREAT I No.__________

C. Type of Activity:

- ☐ Emergency Dredging
- ☐ Regular Maintenance Dredging
- ☐ Placement Site Development
- ☐ Rehandling of Dredged Material
- ☐ Other (Specify)______________________________

D. OSIT Members Contributing:

- ☐ U.S. Army Corps of Engineers-ERB
- ☐ U.S. Fish and Wildlife Service
- ☐ Minnesota Pollution Control Agency
- ☐ Minnesota Dept. of Natural Resources
- ☐ Wisconsin Dept. of Natural Resources
- ☐ Iowa Conservation Commission
- ☐ U.S. Environmental Protection Agency
- ☐ U.S. Coast Guard
- ☐ Public

E. OSIT Meeting.

/_7 Adequate project and meeting notice provided to OSIT; if no, specify problem:______________________________

____

/_7 OSIT meeting held; if no, why not______________________________

____

/_7 OSIT and COE Dredging Coordinator agreed on procedure to follow in project; if no, specify conflict:______________________________

____

/_7 OSIT appeal made to the District Engineer.

/_7 Mutually acceptable resolution to appeal reached; if no, specify remaining conflicts:______________________________

____

F. Dredging Project.

/_7 Dredging accomplished; if no, reasons for cancelling:______________________________

____

____

____

Volume dredged:______________________________

Depth dredged:

/_7 11 feet
/_7 12 feet
/_7 13 feet

Width dredged:______________________________

Number of years since cut last dredged:______________________________

Equipment used:

- [ ] Thompson
- [ ] Thompson and booster
- [ ] Hauser
- [ ] Dubuque
- [ ] Contracted hydraulic
- [ ] Contracted mechanical
- [ ] Other (specify)________________________________

Distance dredged material moved to placement site________________

- [ ] Removal from floodplain placement site.
- [ ] GREAT I selected placement site used(if no, why not)__________
____
- [ ] Special dredging or placement methods used(specify)__________
____

Placement site measures:

- [ ] Directional berming
- [ ] Inclosed berming
- [ ] 100% containment
- [ ] Strengthening berm walls
- [ ] Drop structure
- [ ] Other (specify)________________________________

G. <u>Placement Site Impacts</u>:

- [ ] Aquatic or wetland habitat lost (if yes, type)________________
____
Acres of each:________________________________
- [ ] Terrestrial habitat lost (if yes, type)________________________
____
Acres of each:________________________________

☐ Habitat enhanced or created (if yes, type)______________________

____

Acres of each:______________________________

Probable indirect effects of dredged material placement (what effect, when and how?):

☐ On terrestrial habitat______________________________

____

____

____

☐ On aquatic habitat______________________________

____

____

____

☐ On recreational resources______________________________

____

____

____

☐ Special habitat value on or adjacent to placement site(if yes, specify).

____

____

____

K. Sketch of Placement Site and Proximity to Dredging Cut.

APPENDIX B

GREAT EVALUATION OF THE 1976 DREDGING SEASON IN THE SAINT PAUL CORPS OF ENGINEERS DISTRICT

GREAT RIVER ENVIRONMENTAL ACTION TEAM

Evaluation of the 1976 Dredging Season in the
St. Paul Corps of Engineers District

The following report is the GREAT evaluation of the dredging activities of the St. Paul District, U. S. Army Corps of Engineers, in the Mississippi and Minnesota Rivers during the 1976 dredging season.

Criteria for evaluation were based on the GREAT's 1976 General Dredging Guidelines and the recommendations of the GREAT's on-site inspection team, which is composed of field level members familiar with each project area. The evaluation also took into consideration equipment limitations during the 1976 season as well as the limited number of beneficial use, spoil disposal sites approved by GREAT during the season. Increased capability and the availability of more beneficial use sites will cause the criteria to be stricter in future seasons.

GENERAL EVALUATION

The St. Paul Corps District did a good job of cooperating with the GREAT and mitigating environmental effects of their O&M dredging during the 1976 season. With a few exceptions, the St. Paul District made a significant effort to comply with GREAT recommendations at each site dredged. Not all environmental conflicts were resolved, nor did the Corps District do everything that was reasonably possible to meet recommendations. However, the season was a significant and substantial improvement over past years.

GREAT 1976 GENERAL DREDGING GUIDELINES

I. Objective: Minimize volume of dredged material.

A. All dredging shall be to a depth no greater than 11 feet and a width no greater than 300 feet, unless a qualified fluvial hydrologist indicates that a greater dredging depth and/or width is necessary to maintain the integrity of the system.

B. Dredging shall be suspended during high water periods.

C. Utilize the re-alignment of channel markers as an alternative to dredging in all cases possible.

II. Objective: Effort shall be made in every case where dredging is required to find a beneficial use for material.

A. Material shall be placed in those areas recommended by GREAT.

B. If necessary, in order to accomplish the above objective, private sector capability shall be utilized.

III. Objective: The environmental value of the river system must be protected from degradation resulting from dredging and disposal of dredged material.

A. Removal of dredged material from the flood plain shall be given the highest priority consideration at each site.

B. Advance preparation of each disposal site is essential. In instances where beneficial uses cannot be accomplished, use of previous disposal areas with sand-on-sand placement will recieve priority. Where feasible, disposal areas will be designed for confinement of runoff water utilizing non-errosive control strucures. The additional equipment necessary to accomplish this task must be provided.

C. Full evaluation must be given to environmental impacts associated with dredging and dredged material disposal in accordance with Corps of Engineers and Environmental Protection Agency rules and regulations pertaining to the disposal of dredged or fill material in Navigable Waters. (Fed. Reg. 39(141) and 40(173)).

D. Riverine disposal shall be implemented only for purposes of well designed experiments after review and approval by GREAT.

E. No new spoil sites shall be developed on land or in waters within the boundaries of proposed wilderness areas. Spoil sites presently existing within these boundaries should not be significantly expanded until the Congressional resolution of the wilderness issue.

Summary of Activities

Sites Dredged	Depth (Feet)
USAF	
Below Mpls.-St. Paul Railroad Bridge	12
Above Lowry Ave. Bridge	12
Above N.P. Railroad Bridge	12
Broadway and Plymouth Ave. Bridge	12
Pool 1	
Above Lake Street Bridge	12
Upper Approach L/D#1	11
Minnesota River	
Interstate 35-W Bridge	11
Peterson's Bar	11
Above Savage Bridge	11
Pool 2	
Smith Ave. Bridge (High Bridge)	13
St. Paul Barge Terminal	11
Grey Cloud Slough	13
Grey Cloud Landing	13
Pool 5	
L/D#4 Auxillary Lock	6
Lower Zumbro (Weaver Bottoms)	12
Pool 5A	
Island 58	11
Betsy Slough	11
Wilds Bend	11
Pool 6	
Winona Small Boat Harbor	6
Lower Winona Railroad Bridge	13
Pool 7	
Dresback Island	12
Pool 8	
Above La Crosse Railroad Bridge	13
Head of Raft Channel	11
Pool 9	
Below Lower Lockwall L/D#8	6
Twin Island	11
Indian Camp Light	0
Lansing Upper Light	0

Pool 10	Depth
Mississippi Gardens (Frenchman's Landing)	13
Prairie du Chien	13

Side Channel Dredging	
Devil's Cut	6
Blackbird Slough	6

Results of Activities

	# of Sites
Dredged to 13 feet:	7
Dredged to 12 feet:	7
Dredged to 11 feet:	10
Dredged to 6 feet:	5
Not dredged due to GREAT Recommendation:	2
Total	31
Wing dams or rip rap buried:	2
Significant habitat loss:	7
Spoil barged to beneficial use site:	13
Spoil pumped to beneficial use site:	4
Berming or diking attempted:	9
Water quality tests of traditional methods:	2
Checkerboard Dredging pilot:	1

SITE BY SITE EVALUATION

Following are evaluations of each individual dredging project accomplished by the St. Paul District Corps of Engineers. Within each evaluation are listed any site specific GREAT recommendations for the respective sites, the on-site inspection team's recommendations, the actual action taken by the Corps, and the conclusions of the GREAT concerning the specific project. The first two sites listed in the site-by-site evaluation are actually the evaluations of the several different dredging projects which were accomplished in the same proximity within the St. Anthony Falls Pool and Pool 1.

I. Sites Above St. Anthony Falls

A. Below Mpls.-St. Paul and Sault Ste. Marie Railroad Bridge
B. Above Lowry Avenue Bridge
C. Above Northern Pacific Railroad Bridge
D. Above and Below Broadway and Plymouth Avenue Bridges

R.M. 855 - 857.5, USAF Pool

Work Done With: Hauser

Depth Dredged: 4 sites at 12 feet

Total Volume Dredged:	A.	75,429 cubic yards
	B.	9,042
	C.	8,614
	D.	22,627
	Total:	115,712 cubic yards

GREAT Recommendation: No site specific recommendations

Actions Taken:

1) GREAT general recommendations were partially met.

2) All dredged material was barged to stockpile for beneficial use (Carl Boulange and Sons Construction Company). Stockpile is out of flood plain. However, no justification was given for exceeding 11 foot dredging depth.

Conclusion:

Spoil disposal was handled well. However, dredging depth should have been discussed. No cost estimates have been provided to the Team. Estimates of the extra cost of barging essential to GREAT.

II. Pool 1 Sites

A. Above Lake Street Bridge
B. Upper Approach - Lock and Dam #1

R.M. 848.2 and 850.1, Pool 1

Work Done With: Hauser

Depth Dredged: A. 12 feet
B. 11 feet

Total Volume Dredged:	A.	10,627 cubic yards
		6,483
		17,110 cubic yards

GREAT Recommendation:

Barge material to municipal coal dock area for beneficial use.

Actions Taken:

1) GREAT recommendations partially met.

2) All dredged material was barged to municipal coal dock for beneficial uses. However, no justification was given for exceeding 11 foot dredging depth at Above Lake Street Bridge.

Conclusion:

Spoil disposal was handled well. However, dredging depth should have been discussed for Above Lake Street Bridge. No cost estimates have been provided to the Team. Estimates of the extra cost of barging are essential to GREAT.

III. Minnesota River Above I-35W

R.M. 11 - 11.5, Minnesota River

Work Done By: Contract with Kurtzman Dredging Company

Depth Dredged: COE estimate 11 feet

Total Volume Dredged: COE estimate 24,900 cubic yards

GREAT Recommendation:

No site specific recommendation was originally made. A disposal site on Edward Kraemer and Sons property was endorsed during the dredging season.

Actions Taken:

1) GREAT recommendations were met.
2) All meterials were hydraulically pumped to the approved disposal site. Dredging depth was 11 feet.

Conclusion:

Project well done. An on-site meeting would have clarified arrangements.

IV. Minnesota River - Above and Below Peterson's Bar

R.M. 11.5 - 13, Minnesota River

Work Done By: Contract with Kurtzmann Dredging Company

Dredging Depth: COE estimate 11 feet

Total Volume Dredged: COE estimate 26,950

GREAT Recommendation:

No site specific recommendation was originally made. A disposal site on Cargill Incorporated property was endorsed during the dredging season.

Action Taken:

1) GREAT recommendations were met.

2) All materials were hydraulically pumped to the approved disposal site. Dredging depth was 11 feet.

Conclusion:

Project well done. An on-site meeting would have clarified arrangements.

V. Minnesota River Above Savage Bridge

R.M. 14 - 14.7, Minnesota River

Work Done By: Contract with Kurtzmann Dredging Company

Dredging Depth: COE estimate 11 feet

Total Volume Dredged: COE estimate 12,000 cubic yards of total 19,800 contracted. Remainder to be finished during spring of 1977.

GREAT Recommendation:

No site specific recommendation was originally made. A disposal site on Cargill Incorporated property was endorsed during the dredging season.

Action Taken:

1) GREAT recommendations were partially met.

2) Dredging depth was 11 feet. However, the Lower Minnesota River Watershed District did not provide access to approved disposal area. After a series of meetings and lengthy discussions, the Minnesota DNR approved placement of the spoil at another location owned by the Watershed District, located in the floodway. This

site, the Masonic Home Site, was approved by the Minnesota DNR for "once-only" use, and an on-site meeting was held to coordinate plans for disposal. Dredging commenced in late November, but ice formation prevented conclusion of work during the 1976 season. All dredged material was hydraulically pumped into diked portion of this site.

Conclusion:

Access to the GREAT-approved Cargill disposal site or a similar site is essential. The Masonic Home Site is in the floodway and is not acceptable to the Minnesota DNR for future use. Future disposal must be at the Cargill site, or some other site where the material will be removed from the flood plain.

VI. Above and Below Smith Avenue Bridge (High Bridge)

R.M. 840.3, Pool 2

Work Done With: Hauser

Depth Dredged: 13 feet

Total Volume Dredged: 32,015 cubic yards

GREAT Recommendation:

No site specific recommendation was made.

On-Site Inspection Team Recommendations:

Place material in previous disposal area owned by City of St. Paul out of floodway. Determine why St. Paul has not removed dredged material placed at this site last dredging season.

Action Taken:

1) GREAT recommendations partially met.

2) Dredging depth was not reduced. Spoil was placed in stockpile site in the floodway.

Conclusion:

Anticipated beneficial use of material placed at stockpile site has not materialized. If City of St. Paul is not going to remove material, future disposal must be where spoil will be out of the flood plain.

VII. St. Paul Barge Terminal

R.M. 837 - 837.7, Pool 2

Work Done With: Thompson and booster barge Mullen

Depth Dredged: 11 feet

Total Volume Dredged: 101,837 cubic yards

GREAT Recommendation: No site specific recommendation

On-Site Team Recommendation:

Place dredged material at "North Port" site just west of Holman Airport. Dike and confine spoil at this development site. Use silt curtain during double pump to site.

Action Taken:

1) GREAT recommendations were met.

2) Dredging depth reduced to 11 feet. Spoil double pumped to confined "North Port" site even though closer site was available. Silt curtain was used during double pumping operation. Dike was breached and repaired once during project.

Conclusion:

Project well done. Cooperation during planning and implementation was excellent. Material can be used beneficially by the Port Authority of St. Paul.

II. Grey Cloud Slough (Water Quality Test)

R.M. 827.5 - 828.1, Pool 2

Work Done With: Thompson

Depth Dredged: 13 feet

Total Volume Dredged: 38,414 cubic yards

GREAT Recommendation:

Special situation. Recommendations according to design of Water Quality Work Group. Spoil disposal to be along river bank and into water along shore to facilitate determining effects of this traditional procedure on water quality.

Action Taken:

1) GREAT recommendations for this special project were met.
2) Spoil disposed of along river bank and into water along shore (according to design). Dredging depth was 13 feet to provide a realistic test situation. A running slough was partially blocked.

Conclusion:

Cooperation was good in arranging for the GREAT's water quality test of traditional dredging techniques.

IX. Grey Cloud Landing

R.M. 822.9 - 823.3, Pool 2

Work Done With: Thompson

Depth Dredged: 13 feet

Total Volume Dredged: 19,189 cubic yards

GREAT Recommendations:

No site specific recommendation

On-Site Team Recommendations:

Special consideration given due to COE desire to test effectiveness of polymers and silt curtains via a contract with the River Studies Center (University of Wisconsin--La Crosse). Did not recommend spoil placement along river bank and shore, but conceded that it would be necessary to conduct test.

Action Taken:

1) GREAT general recommendations were waived for test purpose.

2) Dredging to 13 feet. Spoil placement along river bank in traditional, unconfined fashion. A silt curtain was used and monitoring was conducted. However, arrangements were not made to use the polymer. Therefore, no polymer effectiveness tests were conducted.

Conducted:

Cooperation was good, but it is regrettable that the polymer test was not run. Dredged material disposal along the river banks and shore cannot continue to be acceptable to the GREAT.

X. Auxiliary Lock at Lock and Dam #4

R.M. 752.8, at Lock and Dam #4

Work Done With: Hauser

Depth Dredged: 6 feet

Total Volume Dredged: 5,657 cubic yards

GREAT Recommendations:

No site specific recommendations as project was not part of regular 9-foot channel maintenance.

On-Site Inspection Team Recommendations:

No on-site meeting was held.

Action Taken:

1) General GREAT recommendations met.

2) Dredged to 6 feet along channel side of "eye-wall" of Lock #4. Purpose of project was to restore launching area for emergency craft and equipment as part of operations facilities maintenance. Dredged material was barged to the Alma boat launch for beneficial use (placed behind riprap wall of the launch facility to reinforce breakwater).

Conclusion:

Project apparently well done.

XI. Lower Zumbro (Weaver Bottoms)

R.M. 744, Pool 5

Work Done With: Thompson

Depth Dredged: 12 feet

Total Volume Dredged: 51,751 cubic yards

GREAT Recommendations:

No site specific recommendation originally made. However, in response to recommendations for restoring the Weaver Bottoms backwater area, the GREAT, with the exception of Wisconsin, recommended that any spoil be used to block off two chutes which ran between the Mississippi main channel and the Weaver Bottoms. Wisconsin objected on the basis that insufficient data was gathered to monitor the effects in the Belvedere area.

On-Site Inspection Team's Recommendations:

1) Place spoil into Weaver Bottoms cuts at R.M. 744.8 and at 744.9
2) Avoid encroaching on marsh on Weaver side and avoid covering riprap along channel side.
3) Taper spoil to adjacent islands to height above level of 1965 high water.
4) Direct spoil disposal parallel to the length of cut to be filled.
5) Revegetate erosive edge of spoil.
6) Place excess spoil, after cuts are filled, in contained area of Lost Island on Wisconsin side.
7) Continual coordination with Team and contract researchers during project.

Action Taken:

1) GREAT recommendations partially met.
2) Dredging depth limited to 12 feet. Compliance with recommendations was intended and initiated. In the middle of the project, prior to completing the cut fills, the COE altered the recommended procedure and switched disposal to the alternate Wisconsin site until

clarification of additional filling in the Weaver area could be obtained. The Wisconsin site was diked as recommended, but spoil still encroached into a slough and an area of bottomland hardwoods.

Conclusion:

Cooperation was initially good. However, changes from the recommended procedure caused confusion. Better communication on-site should preclude this problem.

XII. Island 58

R.M. 734.5, Pool 5A

Work Done With: Thompson

Depth Dredged: 11 feet

Total Volume Dredged: 17,913 cubic yards

GREAT Recommendations: No site specific recommendations.

On-Site Inspection Team Recommendations:

Place dredged material on old spoil sand bar. Construct berm to contain material and return water should run toward main channel.

Action Taken:

1) GREAT general recommendations and on-site team recommendations met.
2) Spoil was placed on old spoil sand bar. Berming contained spoil, with minimal return flow to main channel. Dredging limited to 11 feet.

Conclusion:

Project handled well. Good cooperation.

XIII. Head of Betsy Slough

R.M. 730.4 - 730.7, Pool 5A

Work Done With: Thompson

Depth Dredged: 11 feet

Total Volume Dredged: 10,526 cubic yards

GREAT Recommendations:

No site specific recommendations

On-Site Inspection Team Recommendation:

Place material in depressions landward of Wisconsin shore (old spoil area and private property). Berm area to contain spoil, and direct runoff toward main channel. Assumption made that Buffalo County, Wisconsin would be allowed to use spoil for sanding roads.

Actions Taken:

1) GREAT general recommendations and on-site team recommendations met.

2) Spoil placed in recommended old spoil area just below Fountain City boat launch. Site was bermed and containment was successful. Arrangements made with Buffalo County to use spoil. Dredging depth limited to 11 feet.

Conclusion:

Project handled well. Good cooperation.

XIV. Wilds Bend

R.M. 730.3 - 730.6, Pool 5A

Work Done With: Thompson

Depth Dredged: 11 feet

Total Volume Dredged: 14,534 cubic yards

GREAT Recommendations:

No site specific recommendations.

On-Site Inspection Team Recommendations:

Contain spoil on existing spoil area. Route runoff toward main channel.

Action Taken:

1) GREAT general recommendations and on-site recommendations partially met.

2) Dredging depth limited to 11 feet. Spoil placed on old spoil area with berming attempted for containment. Runoff was returned to main channel, but control was lacking. Return flow carried enough sand to create a delta (100 ft. x 150 ft.), burying a wing dam and prime fishing area. Sloughing from berms continues to encroach into a backwater slough.

Conclusion:

COE attempted to comply with GREAT recommendations. Containment was inadequate.

XV. Winona Small Boat Harbor

R.M. 725, Pool 6

Work Done With: Hauser

Depth Dredged: 6 feet

Total Volume Dredged: 2,167 cubic yards

GREAT Recommendations:

No site specific recommendation.

On-Site Inspection Team Recommendations:

No on-site meeting called.

Action Taken:

1) GREAT general recommendations met.

2) Harbor dredged to 6 feet. Spoil placed into contained area of old spoil site. Sand was removed by City of Winona for beneficial use (downtown redevelopment).

Conclusions:

Project handled well.

XVI. Below Lower Winona Railroad Bridge

R.M. 723.6, Pool 6

Work Done With: Thompson and Mullen

Depth Dredged: 13 feet

Total Volume Dredged: 37,591 cubic yards

GREAT Recommendations:

1) Investigate the availability of Riverbend Industrial Park Phase II area for receiving dredged material.

2) If this site is approved by GREAT, utilize dredge Wm. A. Thompson, booster barge Mullen and attendant plant in placing dredged material from the channel, should dredging be necessary.

3) General recommendations must be complied with.

On-Site Inspection Team Recommendations:

1) Dredge depth limited to 11 feet

2) Place dredged material in Riverbend Industrial Park by means of placing discharge pipe along old railroad bed.

3) If Peerless Chain Company site (second choice to Industrial Park) is to be used at all, runoff and spoil must be kept out of the Type IV marsh downstream (precautions to include blocking off existing culvert under old railroad bridge).

Action Taken:

1) GREAT recommendations partially met.

2) Dredging depth was not limited to 11 feet. First half of spoil (21,280 cubic yards) pumped to beneficial use site at the Riverbend Industrial Park. The second half of spoil (16,311 cubic yards) was pumped to beneficial use site at Peerless Chain Company (as compensation for allowing COE to cross their property with the discharge pipe to Industrial Park). Sandbags were placed at culvert leading to Type IV marsh.

Conclusion:

Project handled well. Good cooperation except in limiting depth.

XVII. Head of Dresbach

R.M. 705.1, Pool 7

Work Done With: Thompson

Depth Dredged: 12 feet

Total Volume Dredged: 7,600 cubic yards

GREAT Recommendations:

No site specific recommendations

On-Site Inspection Team Recommendatons:

1) Reduce depth of cut to 12 feet.
2) Place no spoil on interior of Dresbach Island (excellent nesting area for waterfowl).
3) Spoil should go on private land on west bank.
4) If forced to spoil on island, place spoil along west bank of island on old spoil. Dike to protect interior.
5) No spoiling at head of island.

Action Taken:

1) GREAT general recommendations and on-site team recommendations partially met.
2) Dredging depth reduced to 12 feet. A dike was constructed to protect interior of Dresbach Island. Spoil placed along west bank of Dresbach Island partially on old spoil, partially in bottomland hardwoods (65% of new spoil area). Initially, spoil was pumped directly back into river and a delta formed. Attempt was made to place spoil on private land along west bank of channel. However, none of the landowners had applied for required permits to place fill on their river bank property.

Conclusion:

COE made attempt at complying with GREAT recommendations. Lack of awareness by dredge crew allowed spoil to encroach on bottomland hardwoods and to be pumped directly back into main channel. Private

landowners asking to receive spoil should be notified of the pertinent state and local permit requirements to place fill on their property as soon as they request spoil placement on their property.

XVIII. Above La Crosse Railroad Bridge

R.M. 699.9 - 700.2, Pool 8

Work Done With: Hauser

Depth Dredged: 13 feet

Total Volume Dredged: 18,248 cubic yards

GREAT Recommendations:

No site specific recommendations.

On-Site Inspection Team Recommendations:

1) Dredging be limited to 11 feet.
2) Place spoil on private land in Shore Acres subdivision in La Crescent, Minnesota. Spoil to be beneficially used for fill.

Action Taken:

1) GREAT general and on-site team recommendations partially met.
2) Dredging depth increased to 13 feet. Dredging alignment changed which resulted in a three-fold increase in spoil volume. Spoil barged to beneficial use site in La Crescent, Minnesota.

Conclusions:

Barging spoil to beneficial use area was good. The need to dredge to 13 feet was questionable.

XIX. Head of Raft Channel

R.M. 686.7, Pool 8

Work Done With: Hauser

Depth Dredged: 11 feet

Total Volume Dredged: 14,047 cubic yards

GREAT Recommendation:

Barge material to Isle La Plume, La Crosse, Wisconsin, for beneficial use.

On-Site Inspection Team Recommendations:

1) Barge spoil to and stockpile on Isle LaPlume, La Crosse, Wisconsin, if dredging must be done.
2) Concurrence could not be reached concerning need for dredging.
3) Limit any dredging to 11 feet.

Action Taken:

1) GREAT general and on-site team recommendations partially met.
2) Dredging did occur. Depth of dredging was limited to 11 feet. Spoil was barged to Isle LaPlume in La Crosse for beneficial use by the City of La Crosse. Dredging was done using a pilot technique called checkerboard dredging. Rather than taking half full, clamshell bites from the edge of a cut, full bites were taken at spaced sites. This left distinct gullies and ridges along the channel bottom. The COE is watching the area to determine if the current will level off the area at the design depth.

Conclusion:

There was reasonable question as to whether dredging was needed. The project was handled well, however, when the project did proceed.

XX. Behind Lower Lockwall of Lock and Dam #8

R.M. 678.9, just below Lock 8, Wisconsin bank

Work Done With: Hauser

Depth Dredged: 6 feet

Total Volume Dredged: 4,167 cubic yards

GREAT Recommendations:

No site specific recommendations, as project was not part of regular 9-foot channel maintenance.

On-Site Inspection Team Recommendations:

No on-site meeting. Coordination with on-site team found agreement with COE design. Waiting and resting harbor for recreational craft to be dredged to 6 feet. Spoil to go to COE beach-picnic area adjacent to harbor.

Action Taken:

1) GREAT general recommendatons met.

2) Recreation boat harbor dredged to 6 feet. Spoil placed in established recreation area.

Conclusion:

Project was apparently well done. Announcement to Team of date(s) of work would have allowed members to observe project. This additional cooperation should have been offered.

XXI. Below Twin Island

R.M. 675.5, Pool 9

Work Done With: Thompson

Depth Dredged: 11 feet

Total Volume Dredged: 6,200 cubic yards

GREAT Recommendations:

No site specific recommendations.

On-Site Inspection Team Recommendations:

1) Don't dredge here. No need.

2) If dredging required, limit to 11 feet and reduce cut to 200 feet wide.

3) Assuming spoil to be pumped to R.M. 676, right bank (Island 129), berm disposal area to keep material out of slough running along backside of island.

Action Taken:

1) GREAT general and on-site team recommendations partially met.

2) Dredging did occur, however depth limited to 11 feet and width limited to 200 feet. Spoil placed in area of good bottomland hardwood, but berming was accomplished and did contain spoil.

Conclusion:

The need for dredging was questionable. The spoil site did not comply with GREAT recommendation. However, cooperation in mitigating effects of project was good.

XXII. Indian Camp Light and Lansing Upper Light

R.M. 666 and 665, Pool 9

Work Done By: The River

Depth Dredged: None

Total Volume Dredged: Zero

GREAT Recommendation:

No site specific recommendation.

On-Site Inspection Team Recommendations:

1) Don't dredge either site. No need is apparent.

2) If dredging deemed required now, delay initiation until early August to determine if still necessary.

Action Taken:

1) On-site team recommendations met.

2) Dredging delayed, soundings conducted. The river began to scour out both sites. COE concurred that no dredging was necessary.

Conclusions:

Cooperation good. All parties gained insight into the river's ability to stabilize and scour its own channel. Good example of accomplishments made possible by the GREAT.

XXIII. Mississippi Garden (Frenchman's Landing)

R.M. 643.1 - 643.3, Pool 10

Work Done With: Thompson

Depth Dredged: 13 feet

Total Volume Dredged: 25,934 cubic yards

GREAT Recommendation:

Barge dredged material to Prairie du Chien for beneficial use.

On-Site Inspection Team Recommendations:

1) Don't dredge. Channel had ample depth and width.

2) If dredging required, limit cut depth to 11 feet, and completely contain spoil wherever it is placed.

Action Taken:

1) GREAT general and on-site team recommendations not followed.

2) Dredging did occur. Dredging depth was to 13 feet. Although a dike was constructed at the spoil site (at R.M. 643, left bank, Frenchman's Landing), it failed within hours of initiation of dredging and the spoil flowed into marsh and slough areas. Spoil placement resulted in direct destruction of a fish spawning area and a feeding area for muskrat and waterfowl. Spoil site is directly below drainage culvert through railroad track and secondary washing of spoil may further damage these areas.

Conclusion:

Better containment needed. Site not noted in Public Notice.

XXIV. Prairie du Chien - East Channel

R.M. 635.3 - 636.7, Pool 10

Work Done With: Thompson

Depth Dredged: 13 feet

Total Volume Dredged: 104,932 cubic yards

GREAT Recommendations:

Place material at beneficial use site at Prairie du Chien.

On-Site Inspection Team Recommendations:

1) Avoid clam beds in East Channel

2) Place spoil in beneficial use site.

Actions Taken:

1) GREAT and on-site inspection team recommendations were partially met.

2) Dredging depth was to 13 feet. Spoil was placed in a beneficial use area. Extensive efforts were made to avoid dredging in the clam beds known to exist. Many clams' shells were dredged up despite these efforts, including those of the endangered Lampsilis higginsi. Significant effort has been initiated since the project to determine how to better avoid damaging clam beds during O&M dredging.

Conclusion:

Good cooperation. Project handled well. On-site team should have spent more time on determining if dredging was needed and pursuing the possibility of limiting dredging depth.

The precautions taken to avoid clam beds are presently being questioned. However, the time and effort spent on avoiding the beds was extensive. The improvements in the project design were substantial.

The knowledge gained from the project has revealed that much more work could or should have been done to avoid the clams. However, this

knowledge was not available when the project was being planned and implemented. Subsequent efforts by the COE to respond to concerns about future O&M impacts on clams have been admirable.

XXV. Devil's Cut (Kieselhorse-Fountain City Bay)

R.M. 736.2, Pool 5A, just below Lock and Dam #5

Work Done With: Hauser

Depth Dredged: 6 feet

Total Volume Dredged: 7,200 cubic yards

GREAT - Side Channel Work:

This dredging was done as part of a GREAT Side Channel Work Group project. Dredging was necessary to provide barge access to a site of partial closing dam project and to provide material for the core of the partial closing dam to be constructed. The GREAT proposed and recommended the work and contributed approximately half of the funds for the overall project.

Conclusion:

Cooperation was excellent. Project handled well.

XXVI. Blackbird Slough

R.M. 728, Pool 6, just below Lock and Dam #5A

Work Done With: Hauser

Depth Dredged: 6 feet

Total Volume Dredged: 2,917 cubic yards

GREAT Recommended Side Channel Work:

This project was recommended by GREAT's Side Channel Work Group. The GREAT endorsed the recommendation and requested that the COE do the work as part of their O&M program. The dredging opened a chute into Blackbird Slough to compensate for another chute which has filled in due to past spoil placement and barge prop-wash. All spoil was barged to a beneficial use site at the Winona Small Boat Harbor.

Conclusion:

Cooperation was good. Project handled well.

The GREAT River

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE 612 72? ?690

January 13, 1977

Mr. Al Kellerstrass
Chairman, River Studies and Planning
Management Committee
Upper Mississippi River Basin Commission
Illinois Division of Water Resources
202 West Miller Road
Sterling, Illinois 60181

Dear Mr. Kellerstrass:

According to your committee's request, I am hereby submitting the GREAT's Evaluation of the 1976 Dredging Season in the St. Paul Corps of Engineers District. The '76 evaluation should be considered by your committee in conjunction with the GREAT's 1977 Dredging Recommendations, which is being sent to you separately by Bill Pearson's office.

We believe the UMRBC will find these documents accurate, well considered, and informative.

Sincerely,

Joseph F. Scott, Jr.

Joseph F. Scott, Jr.
Co-chairman - GREAT I

Attachment

Great River Environmental Action Team
FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725-4690

January 7, 1977

TO: Members of the GREAT

FROM: GREAT - On-Site Inspection Team (OSIT)

SUBJECT: Draft Evaluation of the 1976 Dredging Season in the St. Paul Corps District

Attached for your consideration and action is the on-site inspection team's draft of the GREAT Evaluation of the 1976 Dredging Season.

The draft evaluation will be brought up for discussion and a vote for endorsement during the January 12 GREAT meeting in La Crosse. It is requested that GREAT members review those areas with which they are familiar and provide comment and/or suggested revisions at the January 12 meeting.

OSIT Members Responsible for Preparing Draft Evaluation:

Don Buckhout - MDNR

Nick Gulden - MDNR

Mark Riebau - WDNR

Wendy Thur - WDNR

Michael Vanderford - USFWS

APPENDIX B1

OSIT COORDINATORS

EVALUATION OF THE 1979 DREDGING SEASON

IN THE SAINT PAUL CORPS OF ENGINEERS DISTRICT

GREAT

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725-4690

538 Federal Bldg., 316 N. Robert St., St. Paul, MN 55101

March 31, 1980

To: GREAT-I Voting Members

From: Coordinator, On-Site Inspection Teams

Subject: Evaluation of the 1979 Dredging Season

Attached for your review and action is the draft GREAT-I Evaluation of the 1979 Dredging Season in the St. Paul District. The evaluation work was compiled from written reports submitted by Bruce Hawkinson, Tom Lovejoy, Gary Ackerman, John Lyons, and myself describing site-by-site actions. Dan Krumholz also contributed a great deal of information to fill in gaps left in the written material. I wrote and compiled the draft attached.

This is the first dredging season evaluation prepared since 1976. No evaluations were prepared in 1977 and 1978 due to insufficient report forms coming in from the OSIT's and the low priority given to the evaluations by the GREAT.

Subsequent to your review and action, I believe it would be appropriate to send copies of the '79 season evaluation to the COE District offices in St. Paul, Rock Island, and St. Louis and the Chicago and Vicksburg Division offices. I further suggest that copies be sent to all OSIT members and to the voting representatives on the GREAT-I.

Michael J. Vanderford

Michael J. Vanderford

** Note (June 24, 1980): The GREAT-I concluded it's final meeting on June 20, 1980 without taking any action to revise or formally approve this report.

Great River Environmental Action Team I

EVALUATION OF THE 1979 DREDGING SEASON IN THE CORPS OF ENGINEERS ST. PAUL DISTRICT ON THE UPPER MISSISSIPPI RIVER

Contents | Page

GREAT I EVALUATION of the 1979 DREDGING SEASON

I. INTRODUCTION

A. Background

The following report is the GREAT-I evaluation of the dredging and dredged material disposal activities of the Saint Paul District, U.S. Army Corps of Engineers, in the Mississippi River during the 1979 dredging season. The evaluation was prepared by the On-Site Inspection Teams and the OSIT Coordinator and endorsed by the full GREAT-I. The report also describes general problems encountered during the 1979 season relating to disposal techniques, coordinating procedures, cooperative efforts and evaluation procedures.

Criteria for evaluation of dredging and dredged material disposal activities in 1979 were from the GREAT-I's Guidelines and Objectives for the 1979 Season (April 24, 1979) and the recommendations of the on-site inspection teams (OSIT's) for each pool. Equipment limitations during 1979 were also taken into consideration for the evaluation.

This was the last dredging season in which the GREAT-I was fully functioning. We expect that dredging and dredged material disposal from 1980 through 2025 will be conducted in accordance with the GREAT-I's Dredged Material Disposal Plan and the OSIT's site specific plan refinements.
The Dredged Material Disposal plan is due for final approval and forwarding to the U.S. Congress in July of 1980.

B. GREAT-I Guidelines for the 1979 Season

General Guidelines

1. Objective: Insure adequate advance notification of impending dredging.

   a. General channel notices should be forwarded as soon as possible, and a phone contact made with the OSIT ~~pay~~ pool coordinator informing him of the notice and charts ~~comm.~~ COMING.

   b. Dredging should not commence for at least 14 calendar days following transmittal of specific channel surveys to the appropriate On-Site Inspection Team.

   c. If no conflict, commence dredging no sooner than 2 working days following site inspection except emergency dredging (channel depth of 10 feet). If conflict, delay all dredging until conflicts are resolved according to item D of the "1979 Procedure for On-Site Inspection of Proposed Dredged Material Areas."

2. Objective: Minimize volume of dredged material while maintaining the authorized navigation channel.

a. Dredging depths should be no greater than necessary to maintain the authorized 9-foot navigation channel based on the written recommendations of a qualified fluvial hydrologist.

b. Dredging widths should be no greater than necessary to maintain the authorized 300-foot width unless greater widths are required for navigation at bends. When widths greater than 300 feet are required at bends, the widths to be maintained should be primarily based on the most current technical information available to the District Engineer, and consideration should also be given to written recommendations of licensed tow boat operators qualified in the river area of concern.

c. Final dredging parameters for each site will be determined by the Corps of Engineers at the on-site meetings after consideration of all the recommendations received before and at the on-site meeting.

d. Detailed channel condition surveys and/or dredging should be suspended during periods of high sediment transport.

e. Utilize the realignment of channel markers as an alternative to dredging in all cases possible following Coast Guard concurrence. Proposals for reducing dredging as a result of repositioning channel markers should be brought to the attention of the Coast Guard and to licensed tow boat operators qualified in the river area of concern.

3. Objective: Place material at locations in an environmentally and economically balanced manner, using the following guidelines:

a. In every case where dredging is required, the initial effort should be to place material at a location where a beneficial use for the material can be obtained. Material should be placed in those beneficial use areas recommended by GREAT. If necessary, in order to accomplish the above objective, private sector capability should be utilized.

b. If material cannot be placed at a location where a beneficial use can be obtained, removal of dredged material from the floodplain should be given and next priority consideration at each site.

c. In instances where beneficial uses, or removal from the floodplain, cannot be accomplished, use of previous disposal areas with sand-on-sand placement should receive priority. In such cases, advance preparation of each disposal site is essential. Disposal areas will be designed for confinement of runoff water utilizing nonerosive control structures. Disposal sites should be landscaped (according to guidelines prepared by the Recreation Work Group) upon completion of the disposal operation to make the area suitable for recreational use where determined to be desirable.

d. Avoid new spoil sites developed within the boundaries of proposed wilderness areas. Spoil sites presently existing within these boundaries should not be expanded.

e. The cost of using the most apparent alternative dredging methods and disposal sites should be determined prior tc the on-site meeting and made available to the On-Site Inspection Team members.

f. Attention should be given to barge and towing industry costs that would result, for example, from increased energy usage, transit time, or reduced cargo, such as may be necessitated by reduced depth dredging and/or narrower bend or channel width.

B. <u>GREAT-I Guidelines for the 1979 Season</u> (continued)

<u>Site Specific Material Placement Recommendations</u>

GREAT is currently undertaking an extensive review procedure which will lead to development of long term site specific recommendations for dredged material placement within the study area.

The Corps of Engineers will, however, be required to undertake maintenance dredging prior to development of the site specific recommendations. The locations listed below are therefore recommended as interim dredged material disposal sites pending development of the GREAT site specific recommendations. The interim sites were selected based on the following criteria:

1. The site is non-controversial
2. The site has at some point been approved by GREAT
3. The site is within reach of existing equipment

<u>Recommended material placement sites:</u>

St. Anthony Falls Pool:
A) * RM 855.6 (R)-Mpls

Pool #1:
a) Mpls municiple coal docks

Minnesota River:
a) RM 11.5 (R)-Burnsville
b) RM 12.5 (R)-Burnsville

Pool #2:
a) * Northport
b) * Smith Ave. Bridge, RM 840.4 (R)
c) * St. Paul Airport, RM 836.5 (R)

St. Croix River:
none

Pool #3:
none

Pool #4:
a) * Wabasha-North

Pool #4, continued:

b) Wabasha-South, RM 759.2 (R)-Elliot Gravel Pit
c) * Above Reads Landing-RM 762.7 (L)
d) * Grand Encampment-RM 756.5 (L)
e) * Alma Boat Harbor-RM 754

Pool #5:

a) * Above West Newton-RM 748 (R)
b) * Above Fisher Island-RM 745.8 (R)

Pool #5A:

a) Goltz Property-RM 732 (L)

Pool #6:

a) River Bend Industrial Park-Pearless Chain Co.-RM 723 (R)

Pool #7:

a) all material to Isle La Plume (pool #8)

Pool #8:

a) all material to Isle La Plume

Pool #9:

a) * RM 663.0-beneficial use site #9.03 at Lansing, Iowa
b) * RM 667.0-beneficial use site #9.08 at DeSoto, Wisconsin

Pool #10:

a) * Wyalusing Gravel Pit-RM 623.1 (L) #10.01
b) * RM 615.6-beneficial use site #10.02 at Guttenberg, Iowa
c) * RM 615.9-beneficial use site #10.03 at Guttenberg, Iowa
d) * RM 619.1-beneficial use site #10.04 at Guttenberg, Iowa
e) * RM 635.0-beneficial use site #10.09 at Prairie du Chein, Wisconsin

* = GREAT pursuing approval process; not approved as of 2/24/78.

II. SUMMARY EVALUATION OF THE 1979 DREDGING SEASON

A. General Evaluation

The St. Paul Corps District made a consistent and generally effective effort to protect the river's fish and wildlife resources during its 1979 dredging and disposal activities. Not all of the District's efforts were totally successful, nor did the measures taken to protect these resources meet all of the current demands of the agencies participating in the GREAT-I. However, the actions taken by the St. Paul District during the 1979 dredging season showed a good-faith commitment by the District to protect the river's natural resources.

Evidence of this commitment includes the fact that all material dredged from Pools USAF, 1, 2, and 5A (332,799 cy's) was either barged or pumped to beneficial use sites or stockpiles this year. Extensively diked sites were used to contain 451,200 cubic yards of material from six cuts in Pools 4 and 5. Over 200,000 cubic yards of dredging scheduled

for this season was not dredged or was postponed due, at least in part, to recommendations of the On-Site Inspection Teams (OSIT's). Of particular note, dredging due at Winter's Landing (Pool 7) was not pursued following historical practice. Instead, the COE followed the recommendation of the Pool 7 OSIT, and contracting procedures were initiated to obtain private, mechanical dredging equipment to transport the dredged material to a beneficial use site.

Some problems did arise during the 1979 season, and members of the OSIT's did question the District's commitment to protect the river's resources. Containment structures, which were demanded by resource management agencies several years ago, this year appeared to pose as much threat to the backwaters as the historical practices they were designed to mitigate. Commitments and communications given the OSIT's at site meetings appeared to have been lost on several occasions on their way through the Operations and Maintenance Branch to be implemented. Hydraulic evaluations used to document the need for dredging to a given over-depth often appeared too subjective and lacking substance.

The problems and the progress seen during the 1979 season were both real. Further improvement in handling of maintenance dredging on the river is obviously still necessary. But the 1979 season did show a strong commitment by the St. Paul District to do things "right," to protect the river's natural resources while manipulating its physical character. We commend the District on this strong show of commitment. Continuation of this commitment will be crucial in successfully implementing the GREAT-I's Channel Maintenance Plan.

B. Data Summary

Sites	Volume (cy's)	Depth (feet)
USAF		
Below Soo Line Railroad	26,000	12
Above Lowry Ave. Bridge	2,500	12
Below Northern Pacific Railroad	5,500	12
Above Plymouth Ave. Bridge	24,400	12
Pool 1		
L/A St. Anthony Falls Lock	600	13
Above Franklin Ave. Bridge	14,100	12
Below Franklin Ave. Bridge	16,800	12
Above Lake Street Bridge	29,700	12
Below Lake Street Bridge	10,900	12
Below St. Paul Daymark	11,100	12
Pool 2		
Smith Ave. Bridge	5,700	12
St. Paul Small Boat Harbor	8,800	6
St. Paul Barge Terminal	159,000	13

	Volume (cy's)	Depth (feet)
Pool 4 (lower)		
Read's Landing	130,000	12
Crat's Island	135,500	12
Above Teepeeota Point	74,700	13
Pool 5		
Mule Bend	35,200	13
Below West Newton	32,900	13
Fisher Island	42,600	13
Pool 5A		
Island 58	17,000	13
Pool 6		
Winona Small Boat Harbor	500	6
Gravel Point	0	0
Pool 7		
Richmond Island	0	0
Winter's Landing	0	0
Dakota Island	(advance site preparation)	
Pool 8		
Isle La Plume	(advance site preparation)	
Brownsville	0	0
Pool 10		
McMillan Island	0	0
Total:	784,400 cublic yards	

Results of Activities	No. of Sites
Mechanically dredged sites:	15
Hydraulically dredged sites:	7
(Note: one site used both.)	
Dredged to 13 feet:	7
Dredged to 12 feet:	12
Dredged to 11 feet:	0
Dredged to 6 feet:	2
Not dredged after being scheduled:	5
	26
Wing dams or riprap buried:	0
Significant habitat loss:	2
(Read's Landing and above Teepeeota Point)	

Results of Activities (continued)	No. of Sites
Spoil barge to beneficial use site:	13
Spoil pumped to beneficial use site:	1
Pumping into containment sites:	7
New diking:	1
Water Quality monitoring:	1
Emergency dredging situations declared:	2

III. SITE BY SITE EVALUATION

Following are evaluations of each individual dredging project accomplished by the St. Paul District Corps of Engineers during the 1979 season. Within each evaluation are listed any site-specific GREAT recommendations for the respective sites, the On-Site Inspection Team's recommendations, the actual action taken by the Corps, and the conclusions of the GREAT concerning the specific project. The first two sites listed in the site-by-site evaluation are actually the evaluations of the several different dredging projects which were accomplished in the same proximity within the St. Anthony Falls Pool and Pool 1.

1. Sites Above St. Anthony Falls

A. Below Soo Line Railroad Bridge
B. Above Lowry Ave. Bridge
C. Below Northern Pacific Railroad Bridge
D. Above Plymouth Ave. Bridge

RM 855.3--857.4, Upper St. Anthony Falls Pool
Dates: August
Work done with: Hauser (clam shell)

Depth dredged: 4 sites at 12 feet

Total volume dredged:			
	A.	26,600	cubic yards
	B.	2,500	
	C.	5,500	
	D.	24,400	
	Total:	59,000	cubic yards

GREAT Recommendation:

Place material at RM 355.6R on Minneapolis city property.

OSIT Recommendations:

(No OSIT meeting held due to ready agreement on projects.)

Concurrence received from OSIT pool coordinator to place material at RM 854.8L on property owned by Bolander Construction Company. The OSIT made no depth recommendations.

Action Taken:

1) GREAT guidelines were followed.

2) All dredged material was barged to the Bolander Construction property for removal for beneficial use. The dredged material was directly unloaded from barges to the disposal site using the Crane Barge Wade. The stockpile site is judged to be out of the floodplain.

Conclusion:

1) Dredged material disposal was handled well.

2) The OSIT should have asked for justification for the 12-foot dredging depth. The sites are dredged nearly every year. Therefore, reducing the depth of dredging to 11 feet does not seem to pose a threat of increasing dredging frequency.

2. Sites in Pool 1

A. Lower Approach St. Anthony Falls Lock
B. Above Franklin Ave. Bridge
C. Below Franklin Ave. Bridge
D. Above Lake Street Bridge
E. Below Lake Street Bridge
F. Below St. Paul Daymark

RM 848.5--853.2, Pool 1
Dates: August through October
Work Done With: Hauser (clam shell)

Depth Dredged:	A.	13	feet
	B.	12	
	C.	12	
	D.	12	
	E.	12	
	F.	12	

Total Volume Dredged:	A.	600	cublic yards
	B.	14,100	
	C.	16,800	
	D.	29,700	
	E.	10,900	
	F.	11,100	
		82,600	cubic yards

GREAT recommendations:

(No OSIT meeting was held due to ready agreement on projects.)

Place all dredged material on the Minneapolis coal dock site (RM 852.8R). The OSIT made no depth recommendations.

Action Taken:

1) GREAT guidelines were followed.

2) All dredged material was barged to the Minneapolis coal dock for beneficial use. Dredged material was directly unloaded from barges to the disposal site using the Crane Barge Wade. The stockpile site is judged to be out of the floodplain.

Conclusion:

1) Dredged material disposal was handled well; however, the OSIT should have asked for justification for the 12-foot dredging depth.

2) The Corps of Engineers (COE) should make permanent arrangements with the City of Minneapolis to use the coal docks for dredged material disposal. Each year there is an initial reaction from the City that the site is no longer available to use for disposal. But further checking has always cleared the use of the site. The following letter from Minneapolis City Alderman Parker Trostel indicates the potential future conflict. The site is too valuable for dredged material disposal in Pool 1 to lose it. Action should be taken to assure its continued use. (Letter on following page.)

Letter from Alderman Trostel regarding future use of the coal dock.

minneapolis

PARKER TROSTEL
ALDERMAN SEVENTH WARD

city of lakes

August 3, 1979

Mike Vanderford
2545 Bryant Avenue South, #3
Minneapolis, Minnesota 55405

Dear Mike:

Thank you for asking about whether the dredgings could be continued to be dumped on the coal docks.

Don Risk of the Minneapolis Industrial Development Commission tells me that there is no immediate plan to stop the use of the docks for the Corps' dredgings. As I indicated when I talked with you, there are very long standing plans to use the docks when the Great River Road comes up the west bank of the river. However, this has been a glem in someone's eye for a long time and will remain so until the funding is in front of us. There has been some movement in developing the road within the last six months. Some funding has been appropriated for study. But the actual road is a long way off.

Sincerely,

Parker

Parker Trostel
Alderman, 7th Ward

PT:ar

3. Smith Avenue Bridge

RM 840.5, Pool 2
Dates: July 13 through 20
Work Done With: Hauser (clam shell)

Depth Dredged: 12 feet
Total Volume Dredged: 5,700 cubic yards

Great Reccmmendations:

Place material at 840.3R for beneficial use by the City of St. Paul.

On-Site Inspection Team (OSIT) Recommendations:

(OSIT representation at June 15 meeting: Minn. DNR and PCA, COE, and FWS). Same as the GREAT recommendation.

Action Taken:

1) All material placed at 840.3R. Dredged material was mechanically dredged, barged to the disposal site, and directly placed on the site using the Crane Barge Wade. City of St. Paul gradually removing material.

Conclusion:

1) The GREAT recommendations and guidelines were met.

2) OSIT should have asked for justification for dredging depth. No depth information provided at OSIT meeting.

4. St. Paul Small Boat Harbor (Harriet Island Harbor)

RM 839.7R (At the Wabasha Street Bridge), Pool 2
Dates: July 21 through 27
Work Done With: Hauser (clam shell)

Depth Dredged: 6 feet

Total Volume Dredged: 8,800 cubic yards

GREAT Recommendations:

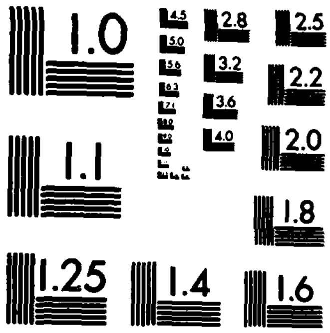
Place material at 340.3R for beneficial use by the City of St. Paul.

OSIT Recommendations:

(OSIT representation at June 15 meeting: Minn. DNR and PCA, COE, and FWS) Same as the GREAT recommendation.

AD-A127 212 GREAT I STUDY OF THE UPPER MISSISSIPPI RIVER TECHNICAL APPENDIXES VOLUME 5 FISH AND WILDLIFE PART II(U) GREAT RIVER ENVIRONMENTAL ACTION TEAM M J VANDERFORD SEP 80 2/5

UNCLASSIFIED F/G 13/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Action Taken:

1) Dredged material was mechanically dredged, barged to the disposal site and directly placed on the site from the barges using the Crane Barge Wade.

Conclusion:

1) The GREAT recommendations and guidelines were met.

2) Dredged material disposal was handled well.

5. St. Paul Barge Terminal

RM 837.0-837.7, Pool 2
Dates: July 12 through August 6
Work Done With: Thompson and Mullen (hydraulic dredge and booster)

Depth Dredged: 13 feet
Total Volume Dredged: 159,000 cubic yards

GREAT Recommendation:

Place material at RM 838.0R, Northport development at Holman Field, St. Paul.

OSIT Recommendations:

(OSIT representation at June 15 meeting: Minn. DNR and PCA, COE, and FWS. Note: The sediment at the St. Paul Barge Terminal contains high concentrations of contaminants.)1) Place material at Northport. 2) Site to be diked, with an interior dike constructed to direct flow of slurry in the containment structure for maximum retention time. 3) Material be removed from the containment site to another stockpile site as the dredging operation was underway. 4)Outfall structure to be constructed for ponded water in containment site. 5) Effluent to be monitored by the COE for contaminants in water and to determine retention time of the containment structure. 6) The full 20 acres of the disposal site should be used for the construction of the containment structure. (The St. Paul Port Authority was only willing to allow use of 12 acres.)

Action Taken:

1) The COE initially agreed to the requests of the OSIT, except that the containment site could not be as large as the 20 acres available due to the Port Authority's restrictions.

2) At a subsequent meeting between the Minnesota Pollution Control Agency (MPCA) and Craig Hinton of the Corps' O & M Branch, it appeared that the COE had either changed its mind on providing the interior guiding dike and having material removed from the

Action Taken (continued)

containment site during the dredging operation, or there was a major flaw in communications between the COE dredging coordinator and the O & M Branch decision makers. The MPCA representative on the OSIT requested an official appeal by the GREAT.

3) The appeal was suspended when the problem was recognized as poor communications within the COE, and the OSIT's conditions were once again accepted by the COE.

4) A 7-acre containment site was constructed with an interior guiding dike and outfall structure included.

5) Some of the dredged material was removed from the site to an adjacent drying area by bulldozers during the dredging project.

6) 24-hour retention time was provided by the containment structure.

7) Effluent monitoring was conducted by the COE during the project (see Table 1).

8) Dredging to 13 feet was accomplished due to the one-time demand for material by the Port Authority at the development site. The 13-foot depth was further justified by hydraulic evaluations of the cut which indicated the cut filled at a uniform rate. Therefore, the extra depth would reduce dredging requirements in the subsequent year or two.

Conclusions:

1) The COE made a considerable effort to comply with the GREAT's and OSIT's recommendations.

2) The breakdown in communications within the COE's Operations and Maintenance Branch was one of several events which occurred during the 1979 season which shook the confidence of the OSIT in the COE's commitment to an environmentally sound channel maintenance program.

3) The containment structure did not provide retention time adequate to comply with MPCA water quality standards.

4) Future dredged material disposal in this vicinity will require even more aggressive efforts on the part of the COE to provide adequate environmental protection. This is particularly critical given that the Northport site will no longer be available for dredged material disposal

Table 1. Effluent monitoring results from the St. Paul Barge Terminal dredging project, July and August 1979.

Date	Suspended Solids mg/liter	Turbidity NTU's	pH	Conductivity
7/20	446	150	7.3	446
7/20	112	60	7.5	552
7/23	215	90	7.5	626
7/24	226	95	7.4	630
7/25	581	150	7.3	631
7/26	445	110	7.0	708
7/27	86,000	10	7.0	892
7/31	788	-	7.0	896
8/01	11,400	1,300	7.0	629
8/02	53,700	1,300	6.9	722
8/03	48,100	1,400	6.9	918

6. <u>Read's Landing</u> (Emergency Dredging)

RM 762.7, Pool 4 (lower)
Dates: May 26 through June 15
Work Done With: Thompson and Mullen (hydraulic dredge and booster)

Depth Dredged: 12 feet
Total Volume Dredged: 130,300 cublic yards

GREAT Recommendations:

Containment site at RM 762.7L (the historical site which had been diked in 1978).

OSIT Recommendations:

No OSIT meeting or notices due to emergency dredging conditions.

Action Taken:

1) Notice of an emergency dredging situation and a 404(b) evaluation were sent by the Corps on May 25. A rapidly developing shoal and rapidly dropping water levels indicated that depths could be reduced to 5 feet in the main channel at low control pool.

2) The containment site at 762.7L was enlarged and reshaped by bulldozers starting on May 26 due to estimates that the site could only hold an additional 112,500 cubic yards of material. The original COE estimate of the volume of material which would be produced from the dredging project at Read's Landing was 250,000 cubic yards.

3) Dredging began on May 29.

4) During the project, the eastern outer face of the containment site began to slough and edged over several acres of previously undisturbed Type 1 wetland. This sloughing was apparently due to the steepness of the containment structure's slopes and the rapid rate of water seepage through the structure's walls.

5) COE proposed to open a side channel immediately downstream of the containment structure to compensate for the adverse impact of the sloughing experience.

Conclusions:

1) The COE made a good-faith effort to minimize the adverse environmental impact of dredged material disposal at the disposal site.

2) The containment structure was not properly operated to avoid additional encroachment into adjacent wetlands.

3) Wetlands were lost due to the operation of the containment structure.

4) Additional roosting trees used by wintering bald eagles were lost along the river bank due to the reshaping and enlarging of the containment structure.

5) The containment structure at 762.7L can not be used for more than one or two additional dredging jobs at Read's Landing without doing substantial additional damage to the backwater habitat to the east and south and to the wintering habitat of the endangered bald eagle to the west and south.

6) The COE will have to obtain funds for either using the abandoned gravel pit (RM 761.2R) in Wabasha for disposal or to remove material from the existing containment site at 762.7L on a regular basis to provide for continued capacity for future dredging.

7. Crats Island (Emergency Dredging)

RM 759.0, Pool 4
Dates: May 30 through June 28
Work Done With: Hauser (clam shell), first 30,200 cubic yards;
Thompson (hydraulic), remaining 105,000 cubic yards

Depth Dredged: 12 feet
Total Volume Dredged: 135,500 cubic yards

GREAT Recommendation:

Place material at the Elliot Gravel Pit in Wabasha, RM 759.2.

OSIT Recommendations:

No OSIT meeting or notices due to emergency dredging conditions.

Action Taken:

1) Notice of an emergency dredging situation was sent by the Corps May 25. A rapidly developing shoal and rapidly dropping water levels indicated that depths could be reduced to 9 feet in the main channel at low control pool.

2) Dredging began May 30 with the Dredge Hauser. The first 1,200 cubic yards of material was taken to the public beach at Wabasha (RM 760.5R) for beneficial use by the city. An additional 29,000 cubic yards was barged to the containment site at Indian Slough (across from Crat's Island) at RM 759.3L for completion of the dike wall.

3) Dredging began on June 16 with the Dredge Thompson. The slurry was 100% contained within the dike walls. Water percolated through dike wall with no apparent problem with sloughing or washouts.

Conclusions:

1) The Corps made a good effort at protecting backwater habitat.

2) The containment structure was apparently well designed and functioned well.

3) The COE will need to obtain funds to periodically empty the containment site to allow for continued future use of the structure during emergency dredging situations.

8. Above Teepeeota Point

RM 757.5, Pool 4
Dates: August 16 through 25
Work Done With: Thompson (hydraulic dredge)

Depth Dredged: 13 feet
Total Volume Dredged: 74,700 cubic yards

GREAT Recommendation:

No obvious recommendation in 1979 Guidelines.

OSIT Recommendations:

(OSIT representation at June ~~19~~ 26 meeting: Minn. DNR and PCA, Wisc. DNR, COE, and FWS; OSIT representation at August 16 meeting: Minn. DNR and PCA, Wisc. DNR, and COE).

1) The OSIT recommended on June 22, 1978 and on June ~~28~~ 26, 1979 that a containment structure be constructed on Federal Island (RM 758.0R)rather than on the Wisconsin side of the main channel (RM 757.6L).

2) Build a containment structure large enough for a single dredging job.

3) The bathtub should be emptied each time it is used, with material being taken to a beneficial use site.

4) Use the Dredge Dubuque to provide for better slurry volume control.

Action Taken:

1) The COE determined that it would be better to construct the containment structure on the Wisconsin side. This decision was based on the larger size of the site, the inability of the COE District to obtain funds to remove material from an existing site, and the fact that the site was already above the 100-year flood level due to past spoil disposal.

2) Dredging was accomplished to 13 feet below low control pool as recommended by the COE's Hydraulic's Branch.

3) The dredged material was placed in the containment structure built at RM 757.6L (Wisconsin side).

4) The Dredge Thompson was used because the Dubuque did not have adequate dredging rate.

Conclusions:

1) The COE's coordination effort in determining the best location for a containment site was good.

2) A misunderstanding arose when a representative of the COE's Environmental Resources Branch told the OSIT that no demand existed for the dredged material. The COE was aware of beneficial use demand by the Buffalo County Highway Department, but could not get the spoil to Alma due to lack of funds and equipment.

3) The COE's choice of the Wisconsin site for the containment structure after the OSIT recommended a reasonable alternative in 1978 and 1979 created bad feelings within the OSIT about the coordination effort. The OSIT had made a considerable effort to provide for the COE's limitations in making their 1979 recommendations on the containment site. The OSIT believed they had already compromised substantially in allowing for the items in their recommendation.

4) The containment structure performed well during the dredged material disposal.

5) The COE needs to obtain funds to periodically empty the containment site at 757.6L to provide for continued future use of the site for interim and emergency dredging.

6) The hydraulic evaluation used to justify dreding to 13 feet was not convincing. The evaluation needs to be better defined and more quantitative.

9. <u>Mule Bend</u>

RM: 748.8 Dates:
Dates: August 7 through 15
Work Done With: Thompson (hydraulic dredge)

Depth Dredged: 13 feet
Total Volume Dredged: 35,200 cubic yards

GREAT Recommendation:

Place material at containment site at RM 748.0R (on Island 42, "Above West Newton").

OSIT Recommendation:

(OSIT representation at August 9 meeting: Minn. DNR and PCA, Wisc. DNR, and COE)

1) Use containment site at RM 748.0R but strengthen dike and place drop structure low on dike wall.

2) Dredge to 11 feet.

3) Watch dike walls constantly.

4) Stop dredging for a period of time if containment site becomes too full of slurry.

5) Notify Coast Guard of misplaced and missing buoys on main channel.

Action Taken:

1) Cut dredged to 13 feet.

2) Dredged material pumped to containment site at RM 748.0R.

Conclusions:

1) The containment structure performed well.

2) The dredging depth evaluation was not adequate to justify dredging to 13 feet. It was difficult to be convinced that the maximum dredging depth should be undertaken because the cut is just downstream of the mouth of the Zumbro River. The Zumbro River contributes mostly fine sediments to the river, which are not the sediments causing the shoaling at Mule Bend.

3) The COE does not believe containment structures are sound for ponding water for water q.ality purposes.

10. <u>Below West Newton</u>

RM: 746.6, Pool 5
Dates: August 26 through 31
Work Done With: Thompson (hydraulic dredge)

Depth Dredged: 13 feet
Total Volume Dredged: 32,900 cubic yards

GREAT Recommendation:

Place material at containment site at RM 745.8R (Fisher Island).

OSIT Recommendation:

(OSIT representatives at August 24 meeting: Minn. DNR, Wisc. DNR, COE, and FWS,)

1) Dredge to 11 feet. No change in depth contours had occurred in the proposed cut from July 25 to August 24. No dredging had occurred at the site since 1975. The cut has never been tried at 11 feet dredging. Further, the containment site at Fisher Island has a limited capacity which will soon be exceeded.

2) Dredging width should not be wider than 440 feet. The OSIT witnessed tows navigating the proposed cut with no apparent difficulty.

Action Taken:

1) The OSIT submitted an appeal to the Co-chairman of GREAT. The appeal was based on the following issues:

   a. The Corps' proposed cut would provide a 525-foot channel. The OSIT recommended a 440-foot channel.

   b. The Corps proposed dredging to 13 feet. The OSIT recommended dredging to 11 feet.

   c. Dredging as proposed by the Corps, with placement of dredged material at the Fisher Island containment area, will exhaust the capacity of the existing disposal site in the area.

2) The Co-chairmen investigated the matter and decided not to pursue the appeal. They believed that the evidence presented by the COE's Hydraulic's Section justified the decision to dredge.

3) The containment structure at 745.8R was used for dredged material disposal.

Conclusions:

1) The Fisher Island containment structure performed well.

2) The hydraulic evaluation process used by the COE needs to be more thorough to be convincing.

11. <u>Fisher Island</u>

RM 745.5, Pool 5
Dates: June 29 through July 11
Work Done With: Thompson (hydraulic dredge) for first 19,900 cy's; Thompson and Mullen (hydraulic dredge and booster pump) for remaining 22,700 cubic yards.

Depth Dredged: 13 feet
Total Volume Dredged: 42,600 cubic yards

GREAT Recommendation:

Place material at the containment site at RM 745.8R (Above Fisher Island).

OSIT Recommendations:

(OSIT representatives at June 19 meeting: Minn. DNR and PCA, Wisc. DNR, COE, and FWS).

1) Place material at Lost Island containment site (RM 744.7L). Greater capacity available at Lost Island site than Above Fisher Island site.

2) Reinforce backside of dike and increase buffer zone between dike and backwaters.

3) Dredge to 11 feet.

4) Resurvey the two cuts to confirm need for dredging.

5) 100% containment would be acceptable at the Lost Island site.

Action Taken:

1) Resurvey accomplished on June 19. COE determined only the upper of the two cuts would require dredging.

2) Dredging began July 2 with the Dredge Thompson alone pumping slurry into the containment site at Lost Island.

3) Dike walls strengthened and drop structure placed on July 3 when it became apparent that no seepage was occurring through dike walls.

4) COE dug outlet above drop structure to relieve pressure on dike walls on July 4. This was done in response to deterioration of dike wall at several locations. The outlet was eroded by the outflowing water, resulting in from 5,000 to 10,000 cubic yards of the dike being washed into the main channel border.

5) The Booster Barge Mullen was brought in, and the remainder of the cut was dredged using the Fisher Island containment site for disposal.

6) The Derrick Barge Hauser was brought in to reclaim 9,000 cubic yards of dredged material lost from the ruptured dike wall, and to reconstruct the dike wall.

Conclusions:

1) The dike wall rupture, along with the dike wall sloughing at Read's Landing, made the use of containment sites questionable.

2) The COE responded well to the dike wall deterioration and to the washout.

3) Communications between the COE's Operations and Maintenance Branch and other agencies was very poor in providing immediate information on the dike rupture at Lost Island. Several different explanations of what happened were given to different OSIT members, aggrevating an already stressful situation.

12. Island 58

RM 734.2, Pool 5A
Dates: October 30 through November 5
Work Done With: Hauser (clam shell)

Depth Dredged: 13 feet
Total Volume Dredged: 17,000 cubic yards

GREAT Recommendation:

Place material at RM 732 L for beneficial use by Fountain City or Buffalo County.

OSIT Recommendations:

(OSIT representatives present at September 20 meeting: Minn. DNR and PCA, COE, FWS, plus 4 members of Buffalo County Highway Department.)

1) Barge material to Alma or Fountain City for beneficial use.

2) Dredge to 11 feet.

Action Take-·

1) The cut was made to 13 feet.

2) All material was barged to RM 732L (Fountain City for beneficial use).

Conclusions:

1) The COE complied with the GREAT recommendations and guidelines except in dredging to 13 feet.

2) A communications failure by the COE at the June 19 OSIT meeting at Teepeeota Point was revealed at the September 20 OSIT meeting for Island 58. A representative of the COE told the Pool4 OSIT that they had looked for beneficial users and that no demand existed in the Pool. The Buffalo County Highway Department representatives present at the Island 58 meeting stated they needed 75,000 cubic yards of material that summer and at least 20,000 cubic yards of material annually after that. They further stated that they had attempted to contact the COE about this demand while the containment structure at Indian Slough (Above Teepeeota Point) was being built.

13. Winona Small Boat Harbor

RM 726.0 L, Pool 6
Date July 2
Work Done With: Hauser (clam shell)

Depth Dredged: 6 feet
Total Volume Dredged: 500 cubic yards

GREAT Recommendations:

None for this site.

OSIT Recommendations:

No OSIT meeting held due to the small scale of the project and beneficial use of the material.

Action Taken:

1) All material placed at 726.0 L and removed for beneficial use.

Conclusion:

1) Dredged material disposal handled well.

14. Gravel Point (Not Dredged This Season)

RM 721, Pool 6
Dated Scheduled: August 13
Scheduled Equipment: Dubuque (hydraulic dredge)

Scheduled Depth: 13 feet
Scheduled Volume: 18,000 cubic yards

GREAT Recommendation:

Take all material to Pearless Chain Company or Riverbend Industrial Park, Winona.

OSIT Recommendation:

(OSIT representatives at August 8 meeting: Minn. DNR and PCA, COE, and FWS).

1) Dredge only to 11 feet.

2) Barge material to 720.5R (private property)beneficial use site.

Action Taken:

1) COE hydraulic evaluation conducted. Evaluation concurred with OSIT 11-foot dredging depth recommendation.

2) COE Operations and Maintenance Branch determined 11-foot dredging with hydraulic dredge would result in slurry with very low solids percentage and the potential for environmental damage would be too high.

3) Hauser not available for dredging.

4) COE decided to postpone dredging, pending an indication the shoal was becoming a serious problem.

Conclusion:

1) The COE complied with the guidelines and recommendations of the GREAT and OSIT.

15. <u>Richmond Island (Not Dredged This Season)</u>

RM 711.8, Pool 7
Date Scheduled: July
Scheduled Equipment: Hauser (clam shell)

Scheduled Depth: 12 feet
Scheduled Volume: 12,400 Cubic yards

OSIT Recommendations:

(OSIT representatives at June 26 meeting: Minn. DNR and PCA, Wisc. DNR, COE, and FWS).

1) Barge all material to Trempealeau boat launch for beneficial use.

2) Dredge to 12 feet.

Action Taken:

1) Dredging delayed till Hauser available.

2) Cut resounded in late July in preparation for dredging. Sounding shows no signs of aggredation.

3) Dredging cancelled due to shoal stability and scheduling problems with Hauser.

Conclusions:

1) The COE complied with GREAT and OSIT recommendations and guidelines.

16. <u>Winter's Landing (Not Dredged This Season)</u>

RM 708.4, Pool 7
Date Scheduled: July
Scheduled Equipment: Contract Mechanical Dredge and Barges

Scheduled Depth: 12 feet
Scheduled Volume: 70,000 cubic yards

GREAT Recommendation:

Barge material to Isle La Plume in Pool 8, LaCrosse.

OSIT Recommendations:

(OSIT representatives at June 26 meeting: Minn. DNR and PCA, Wisc. DNR, COE, and FWS)

1) Dredge to 12 feet.

2) Barge material to Trempealeau boat ramp for temporary stockpiling and removal for beneficial use by the city and county.

3) Definitely do not dispose of material at historical sites on Minnesota or Wisconsin side, because of habitat loss which would result.

4) Do not use "riverine" disposal (placement in the main channel downstream), because of high potential for further adverse impacts on Lake Onalaska and potential adverse impacts on fish wintering habitat in the main channel.

Action Taken:

1) The COE Environmental Resources Branch prepared a 404(b) evaluation on the historical disposal sites and on riverine disposal, and "determined that no appropriate sites were available for hydraulically dredged material".

2) The COE began contracting procedures in September for mechanical dredging and barging to Trempealeau.

3) Dredging season ended without further shoaling problems or obtaining a contract for the planned dredging.

Conclusions:

1) The COE made an excellent effort to comply with the OSIT's recommendations.

2) The stability of the shoal at Winter's Langing should be thoroughly studied to determine if regularly scheduled mechanical dredging could provide the 9-foot depth the COE is obligated to provide.

17. <u>Dakota Island Containment Structure</u>

RM 706.5R, Pool 7
Date: September 20

OSIT Recommendations:

(OSIT representatives present at September 20 meeting: Minn. DNR and PCA, COE, and FWS).

1) Don't build containment structure.

2) Barge any material dredged in vicinity to Isle La Plume.

3) If structure is built, build only a partial dike. Such partial berms and dikes are less environmentally destructive than 100% containment structures built for water quality purposes.

Action Taken:

1) Dike wall was built along island shore facing river bank.

2) Dike built so vegetation mitigates aesthetic impact on City of Dakota.

Conclusions:

1) COE made good effort to comply with recommendations of the OSIT.

2) Having a temporary stockpile site at Dakota Island is consistent the proposed GREAT-I Dredged Material Disposal Plan.

18. Isle La Plume Stockpile Site

No dredging was planned here. The meeting was held to plan for future use of this major stockpile site.

RM 696.5L, Pool 8
Date: August 22

OSIT Conclusions on future use of this stockpile site:

(OSIT representatives at the August 22 meeting: Wisc. DNR, COE, and Public Participating Work Group.)

1) Dry handling of material is much better than slurry delivery of dredged material to the site.

2) An investigation is needed to determine:

a. drainage from site,

b. site preparation costs, and

c. encroachment into the main channel which would result from rehandling operation.

3) The COE would determine the best means for getting backhoe equipment to the site.

4) The Wisc. DNR would prepare material rehandling guidelines.

5) Robers Dredging Company is prepared to provide alternate beneficial use disposal sites if Isle La Plume is not workable.

19. Brownsville (Not Dredged This Season)

RM 689.0, Pool 8
Date Scheduled: June
Scheduled Equipment: Hauser

Scheduled Depth: 13 feet
Scheduled Volume: 38,000 cubic yards

GREAT Recommendation:

Barge all material to Isle La Plume at LaCrosse.

OSIT Recommendations:

(OSIT representatives at June 16 meeting: Minn. DNR and PCA, Wisc. DNR, COE, and FWS.)

1) Resurvey cut to check for need.

2) Dredge to 11 feet, if dredging needed.

3) Barge material to Isle La Plume.

4) If #3 not possible, use Hauser to deliver material to RM 688.8R (Sandbar Marina).

5) Use Dubuque hydraulic dredge if Hauser not available.

Action Taken:

1) Cut resounded. Second survey showed improvement in shoal condition.

2) Dredging cancelled due to stability of shoal and scheduling difficulty with Hauser.

Conclusion:

COE complied with GREAT and OSIT recommendations and guidelines.

20. <u>McMillan Island (Not Dredged This Season)</u>

RM 618.0, Pool 10
Date Scheduled: November
Scheduled Equipment: Thompson (hydraulic)

Scheduled Depth: 12 feet
Scheduled Volume: 65,000 cubic yards

GREAT Recommendation:

Place material at RM 619.1R, at the end of the airport runway on Abels Island, for beneficial use.

OSIT Recommendations:

(OSIT representatives at September 26 meeting: Iowa Natural Resources Council, Iowa Department of Environmental Quality, Iowa Conservation Commission, COE, and FWS.)

1) Don't dredge this cut this year (too little justification; too late in season).

2) 11 feet dredging depth, if necessary at all.

3) Maximum width of 500 feet.

4) Dispose of material at Essman Gravel Pit, RM 619.1R.

Action Taken:

1) No dredging was undertaken due to unavailability of Thompson and relative stability of the shoal.

Conclusions:

1) The COE essentially complied with the OSIT's recommendations due to scheduling difficulty.

2) As the COE's hydraulic evaluation showed the McMillan Island shoal to be so consistent in its aggredation rate, regular dredging should be scheduled to allow for material to be barged to a known beneficial use site such as the Wyalusing Gravel Pit.

IV. PROBLEMS DURING THE 1979 SEASON

Several specific problems arose during the 1979 dredging season in the GREAT-I area which deserve special attention. Pointing out these problems is not intended to assign blame or responsibility. Rather, this is intended

to help alleviate future problems and to direct special attention to areas needing special attention.

A. 100% Containment Sites

Previous to and during the early stages of the GREAT-I program, nearly every natural resource agency working on the river was demanding the COE provide better protection of the backwaters during dredge material disposal by building directing berms and containment dikes. After some initial resistance, the St. Paul District began obtaining funds for and building such structures. In 1977 and 1978 the end results of this approach began to appear at major shoaling areas along the main channel. Large capacity, 100% containment sites were built at such places as Read's Landing, Mule Bend, and Crosby Slough.

These large "bathtubs", as the OSIT's call them, were to serve three purposes: to keep spoil out of the backwaters, to comply with the Minnesota PCA's water quality standards, and to comply with the Wisconsin DNR's floodplain management regulations. However, during the 1979 season several major problems surfaced. Two problems had to do with the operation of such structures. During the emergency dredging operation at Read's Landing, the receiving bathtub started to creep into the adjacent backwaters of the Nelson-Travino Bottoms as percolating water caused sloughing of the dike wall. In Pool 5, the bathtub at Lost Island had to be breached in the midst of a dreding and disposal project as not enough water percolated through the dike walls to assure the integrity of the containment structure.

However, the most critical problem with the bathtubs is that the intended major benefit to water quality and floodplain management do not justify the destruction of fish and wildlife habitat resulting from the construction and use of the containment structures. The fish and wildlife habitat on the river needs safeguarding more than water quality or floodplains. The continued use of existing structures may be justified if operated properly, given that the direct habitat loss has already occurred. However, additional containment sites should not be built for water quality or floodplain benefits if fish or wildlife habitat will be lost.

B. Containment Site Meeting

In mid-July the OSIT's were justifiably shaken by the "failures" of the bathtubs at Read's Landing and Lost Island. The OSIT representatives had two examples of the containment sites not working and no real explanation as to what had happened nor what was being done to assure that such problems wouldn't re-occur. In addition, the COE continued to plan for use of additional containment structures.

In response to a request from the OSIT Coordinator, the chief of the St. Paul District's Construction-Operation Division agreed to hold a meeting for the OSIT representatives to talk about what had happened at Read's Landing and Lost Island and to explain and discuss measures to make the use of containment structures sound. Notice of this August 15 meeting was sent to all GREAT-I Team and OSIT members on July 24.

Unfortunately, at the meeting we never got to deal with the issue of how to improve the design and use of containment structures. Discussion between resource agency solicitors and division chiefs and the COE representatives dominated the first 2 hours. It was further aggrevating because the matters they were arguing were matters OSIT members had resolved some time before. The meeting was virtually ended when a Wisconsin DNR solicitor declared that his agency would no longer allow the use of containment structures. Despite it being later realized that the solicitor had been mistaken in his pronouncement, the meeting was at an impasse, and the OSIT Coordinator adjourned the meeting.

Problems such as the lack of reason and faith apparent at this meeting have to be overcome for the GREAT-I Channel Maintenance Plan to work. Reciprocity is essential.

C. Communications Between the OSIT's and the O & M Branch

There were several instances during the 1979 dredging season when OSIT members were told one thing at a site meeting by the COE's dredging coordinator and it later appeared that something else had or would occur during a disposal operation. This generated many questions amongst the OSIT members. Some speculated that the COE's dredging coordinator either was untrustworthy or was incapable of getting his promises through the Operations and Maintenance Branch. Others were sure the new chief of the maintenance section was reactionary and was purposely changing project designs agreed to by the dredging coordinator. Some just saw it as a sign that the COE was just as bad as ever.

The OSIT Coordinator discussed this problem at length with the chief of the Construction and Operation Division and action was promised. This sort of problem can only be solved by consistent and clear response by the COE to commitments made.

D. Effective Use of OSIT's

The OSIT's were more active and effective in protecting fish and wildlife resources of the river this year than in any previous years. The OSIT's held many preliminary meetings before meeting with the COE on-site. In some instances the OSIT's prepared a common, documented response for the COE's dredging coordinator. Appeals were made in cases which challenged decisions by the dredging coordinator.

Getting the OSIT's to be fully effective is still a problem, however. There still is a vagueness about what influence the OSIT's have, and what a well prepared, documented case can do in protecting the resources. The experience of the last several years has shown that the St. Paul District is interested in conducting their work so that it is compatible with the river's natural resources. However, the District needs funds and authorization to pursue this course. There is no stronger or respected voice in justifying such grants of funds and authority than the OSIT's when they have prepared a good case.

E. Hydraulic Evaluation of Dredging Needs

The validity of the hydraulics evaluation used by the St. Paul District during the 1979 dredging season was questioned on several occasions. These questions occurred in determining the depth to which a shoal should be dredged. While the items considered in the dreding depth determination appeared reasonable, it didn't seem that the parameters considered were examined very closely.

An example is that the Mule Bend and Below West Newton shoals were both dredged to 13 feet this year, at least in part, because they both lie immediately downstream of a major tributary, the Zumbro River. The Zumbro River is an obvious sediment source; however, the sediments coming from the Zumbro are predominately fines, not the sediments which contribute to a shoal such as Mule Bend or Below West Newton.

The need for a sound procedure for determining dredging depth is still valid. The present hydraulic evaluations used by the St. Paul District does not appear thorough enough to fulfill this need. It's better than nothing, but it still leaves too many questions unanswered.

APPENDIX C

LETTERS OF 1974 RELATING TO THE DEVELOPMENT OF THE CORPS OF ENGINEERS WILLINGNESS TO PERFORM SIDE CHANNEL OPENINGS,

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:

DAEN-CWO-M 10 June 1974

SUBJECT: Back Channel Dredging - Upper Mississippi River

Division Engineer, North Central

1. Reference is made to the briefing 10 May 1974 by Rod Cox and Walt Johnson concerning dredging in the Upper Mississippi River.

2. During the briefing and subsequent discussion, DOI representatives claimed the Corps is responsible for blocking entrances to a number of sloughs by our maintenance dredging operations. It was understood that Civil Works would seek means to assist DOI where legal and proper.

3. While the Corps does not have the authority to perform work, without reimbursement, when based solely on a request from another agency, there are situations where work at Corps expense can be justified. In locations where it can be determined that our maintenance dredging operations have in fact contributed to back channel clogging or other unacceptable environmental damage, it is appropriate that Corps authority permit the provision of suitable remedial measures. The District Engineers may make a determination that Corps dredging operations caused the adverse conditions in the back channels, where:

a. A review of past records of dredging and disposal operations indicates that a reasonable appraisal of the data supports such a conclusion.

b. A review of photographs, charts, and surveys provides sufficient data from which a reasonable deduction could be made establishing Corps responsibility.

c. An evaluation of pertinent data assembled by the A/E in connection with the preparation of the EIS is considered sufficient and of such relevancy to support a determination as to Corps responsibility.

d. An evaluation of the hydraulic flow characteristics in the channel and a comparison of grain sizes of the materials dredged with those in the disposal areas and back channel areas support the conclusion of Corps responsibility.

e. Judgments by the District Engineer should be tempered by application of sound engineering principles to the available data.

4. On the basis of the above and other appropriate factors, the District (1) Engineer should review back channel clogging to determine specific areas where maintenance dredging operations are a factor and for which the Corps (2) has the authority to perform remedial work. A preliminary scope of work and cost estimate should be developed for relieving the situation at each (3) location. A list of these locations should be furnished BSF&WL outlining the FY 75 O&M funds which could be made available for this purpose. BSF&WL (4) should be requested to coordinate with appropriate State agencies to provide the District Engineer a listing of priority locations which can be (5) accomplished within available funds, and to designate disposal areas for each location within the capabilities of our dredging equipment. BSF&WL (6) should be advised that the Corps will make efforts to budget for funds for FY 76 to continue the program, if necessary. Further, the Corps will (7) provide assistance to the Department of Interior in efforts to budget funds for dredging of other back channel locations where maintenance dredging operations were not considered to be a contributing factor and for which the Corps has no authority to dredge.

5. This office should be advised of the scope of the program, the funds requirements and the results of the coordination actions with the BSF&WL as outlined above.

FOR THE CHIEF OF ENGINEERS:

J. W. MORRIS
Major General, USA
Director of Civil Works

CF:
St. Paul District
Rock Island District

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:

DAEN-CWZ-P

28 June 1974

Honorable Nathaniel P. Reed
Assistant Secretary of the Interior
Washington, D. C. 20240

Dear Nat:

This is in response to your letter suggesting a field level meeting concerning dredge disposal activities in the Upper Mississippi. I apologize for my lateness in answering. Things have been hectic and I also have been in Europe for two weeks.

First of all, I think that a jointly sponsored field level meeting between your BSFW Regional Directors and our Upper Mississippi Division and District Engineers is a good idea. The matter of timing is a little complicated. As you are aware, on 11 July at 3:30 PM in the Secretary of the Army's conference room (The Pentagon, 2E687) I will discuss our role, problem, and plans in maintaining the navigability of the Nation's waterways. I am gratified you will be able to attend.

In line with your ideas on the Upper Mississippi, I have advised General Bachus of our North Central Division to review back channel clogging to determine specific areas where maintenance dredging operations are a factor in blocking sloughs and for which the Corps might have authority to perform remedial work. Our Division and District people will be coordinating with your field people on this matter in the near future. Should remedial work be determined to be justified on a case by case basis, BSFW field personnel will be asked to coordinate with appropriate State agencies to provide District Engineers a listing of priority locations, and to designate possible disposal areas for each location within the capabilities of our dredging equipment. Where maintenance dredging operations are found not a contributing factor to back channel clogging, we will ask you to fund remedial dr dging. We will be happy to provide assistance in your efforts to budget funds for these latter dredging operations.

I suggest that after my briefing on 11 July we establish some dates for a jointly sponsored field level meeting.

Sincerely,

J. W. MORRIS
Major General, USA
Director of Civil Works

CF:
Mr. Greenwalt, DOI
Div Engr, NCD
Dist Engr, St. Paul
Dist Engr, Rock Island

CO-MA

DISPOSITION FORM

For use of this form, see AR 340-15, the proponent agency is The Adjutant General's Office.

REFERENCE OR OFFICE SYMBOL	SUBJECT
NCSCO	Back Channel Dredging Conference with U.S. Fish and Wildlife Service

TO	FROM	DATE	CMT 1
Memo for Record	Chief, Construction-Operations Division	1 August 1974 Mr. Goetz/jp/7541	

1. On 25 July 1974 Major Hintz and I met with Mr. Jack Hemphill, Regional Director U.S. Fish and Wildlife Service and Messrs Gordon Hanson, Bill Martin, Dennis Chase, Joe Scott and Keith Larson of USF&WS to discuss back channel dredging.

2. Mr. Hemphill expressed their concern of the effect of back channel dredging on the marshland production of wildlife food and indicated that they preferred to use areas where eutrophication has reached later stages and where access channels or circulation channels are desirable for test projects of back channel dredging. He also stated that they would coordinate their work with the State through the Upper Mississippi River Conservation Commission. Mr. Hemphill also made it clear to us that they were not opposed to dredging required to maintain the 9-foot channel but were opposed to spoil placement in various areas.

3. It was decided that USF&WS would select at least 15 sites which would meet the cited criteria in the 10 June 74, OCE, letter authorizing back channel dredging. These 15 sites would be the basis for selection of 5 sites after coordination with the States involved. We suggested that selection be made at an early date to allow time to schedule our floating plant or to issue plans and specs and to advertise for contract work if necessary. Since the State of Iowa has requested access to a State Park in the vicinity of our dredging activity near Wyalusing, BSF&WS agreed to provide us with a decision on the Wyalusing project within a week. A meeting would then be set up to determine the method of dredging required and placement of the dredged material. Major Hintz agreed to provide Hydraulic Branch personnel as required to assist in selecting the most desirable type of back water channel from the standpoint of accomplishing circulation without excessive siltation at the entrance.

4. Messrs Bill Martin and Gordon Hanson will continue as contacts for the USF&WS as will Dennis Cin for the Corps.

5. Our plant which could be utilized in back channel dredging will be furnished to the USF&WS to indicate working room required to dredge a channel. The dredge recently acquired in the Rock Island District could possibly be made available next year.

6. A request was made by Keith Larson for prints for normal flow maps under contract with Earl Meier for Pool 4 downstream. I was not aware of any maps being acquired under contract but would advise them later if available.

NCSCO 1 August 1974
SUBJECT: Back Channel Dredging Conference with U.S. Fish and Wildlife Service

7. An item related to both back channel dredging and our permit program was brought up by Joe Scott. Apparently a bridge had been replaced by fill without a culvert in West Newton Chute. This will be investigated as a possible illegal activity under Section 10 (apparently happened prior to our involvment with Section 404).

8. Our next meeting will be held about 5 August.

Wm. L. Goetz

WM. L. GOETZ
Chief, Construction-Operations Division

APPENDIX D

SCOPE OF WORK FOR THE SIDE CHANNEL WORK GROUP'S RESEARCH CONTRACT TO DETERMINE THE EFFECT OF OPENING SIDE CHANNELS (1979)

MAC
~~xxx~~
~~Sol xxx~~
x EA
RS

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

March 21, 1975

REQUEST FOR PROPOSAL

NO. FWS 8-170

Side-Channel Opening Research
Upper Mississippi River

Scott	JS
Peters	
Peterson	
Decker	
Chase	
Smith	
Vanderford	
Bannister	
Wolflin	
Beamon	
Johnson	
R.O.	
Library	
File GREAT	Side Ch Open
Destroy	

Technical Specifications
for
Side-Channel Opening Research,
Upper Mississippi River

The U. S. Fish and Wildlife Service (Ecological Services and Division of Population Ecology Research), in cooperation with the Great River Environmental Action Team (GREAT), is requesting the submission of research proposals concerning the effects of side-channel openings upon fish and wildlife in backwater areas of the Mississippi River. The following information outlines problem areas, objectives, and other details concerning the proposed research.

Background Information for Work to be Done

The Great River Environmental Action Team is currently planning and initiating work to plan for and implement multiple use management of the Upper Mississippi River. Of primary importance to GREAT is determining ways of minimizing the impact of navigation-channel maintenance on fish and wildlife. The U. S. Fish and Wildlife Service, through congressional mandate and as a member of GREAT, is charged with determining what effects this maintenance has had on fish and wildlife and with finding means toalleviate the adverse effects.

The cooperative effort of GREAT has made it possible to create side-channel openings from the main channel of the river to specific backwater areas. This has long been suggested as a means to alleviate some of the adverse effects of channel maintenance on fish and wildlife. However, it is necessary to demonstrate specific effects such

side-channel openings will have on fish and wildlife before the U. S. Fish and Wildlife Service or GREAT can develop standardized backwater opening procedures and methods.

Stream alteration by side-channel openings shows good potential for restoring the high quality of many backwater areas. However, it has not been demonstrated that such work will improve fish or wildlife conditions at any given site. There is the possibility that this type of stream alteration will harm rather than help fish or wildlife habitat in some types of backwaters. Increased sedimentation rates, increased turbidity, increased eutrophication, and undesirable changes in habitat type are all possible effects which concern the Service and GREAT. Present knowledge on the subject is not sufficient to allow the Service to successfully predict what will happen at any given location as a result of a side-channel opening.

Objective and Scope of Work

The work to be done under this contract must provide for the Ability to Reasonably Predict Site Specific Consequences to Fish and Wildlife Resources of Providing Freshwater Flows to Backwater Areas by Means of Side-Channel Openings From the Main Channel of the Mississippi River. All services, labor, materials, supplies and equipment necessary to provide such capability must be included in the proposal.

a. The basic objectives of the study are:

   1) To determine what changes in fish and wildlife resources result when freshwater flows are restored by side-channel openings in

a representative range of backwater types.

2) To compare and correlate the biological and physical-chemical data gathered in this determination so as to provide a method or model which can be used to reasonably predict the effects of openings made at any site on the impounded Upper Mississippi River.

b. It is suggested that the determinations of effects be made by monitoring backwater conditions and use by fish and wildlife at a variety of backwater locations both before and after a side-channel cut is made. Atleast one year of pre-opening work and several years of post-opening work are suggested. The pre-opening year and the first post-opening year should be intensive monitoring periods, while the succeeding years might require less intensive surveys. The variety of locations should be representative of the backwater habitat types existing on the Upper Mississippi River.

c. Locations of Work: It is suggested that the backwater areas studied under this contract be one of those listed below. The intent of this research necessitates that contractors have daily access to these sites. It is, therefore, required that the contractors be located on the Upper Mississippi River or near enough to it to make daily access possible when necessary.

Possible Study Sites

Pool 5 RM 747.7 (MN)	West Newton Chute - Half-Moon Lake Landing (Area of Half-Moon Lake Landing, Murphy's Cut, and Half-Moon Lake)
Pool 5A RM 735.0 (WI)	Above Fountain City (Fountain City Bay, Slough Area)
Pool 6 RM 724.5 (WI)	Sam Gordy Slough (Limited Study of effects of wing-dam alteration or side-channel cut)
Pool 8 RM 689.2 (WI)	Crosby Slough-Brownsville (Area between main channel and Crosby Slough just east of Brownsville)
Pool 10 RM 630.0 (IA)	Johnson Slough

d. Parameters: It is suggested that the physical, chemical, and biological parameters used to describe and monitor specific sites be among those listed below:

Physical-Chemical (Predictive Qualities)	Biological (Descriptive)
turbidity	vegetation (reparian and aquatic)
dissolved oxygen	benthos (open and energent areas)
temperature	wildlife
nitrate-phosphate in water	fish
nitrate-phosphate in sediment	
hydrographic mapping	plankton
sediment type, distribution	
sedimentation rates	hunter and/or fisherman use
sediment organic content	area of spawning sites
current velocity	periphyton
duration and period of inundation of upland and shoal areas	

e. The contractor may choose to investigate only certain aspects of side-channel openings. These proposals will be evaluated in the same manner as those proposals investigating a broader range of physical, chemical and biological parameters.

f. The objectives of the research project will be fostered as much as possible in scheduling the time which a particular side-channel cut is made. The research proposal should designate the date or dates that a cut should be made at a study site to best enhance the success of reaching the stated objectives. If the Corps of Engineers is unable to complete the side-channel openings as scheduled, the contractor will continue existing studies until completion of the study.

g. The potential contractors should submit separate technical and cost proposals. The technical proposal will have: (1) A statement of objective(s), (2) introduction, (3) materials and methods, (4) method of presentation of results, and (5) a work schedule. Cost proposals should be submitted on Form DD 633.

h. Payments will be made quarterly, upon receipt of invoices and satisfactory quarterly reports to Service project leaders. The final payment will be withheld pending receipt of the final report to Service project leaders. Graduate theses and publications are regarded as important adjuncts of the project, but shall not be regarded as a substitute in whole or in part for the final report.

Time of Completion of Work

a. It is suggested that the work contracted will take at least three years to complete. Longer schedules will be fully considered should they be necessary to determine the chronic effects in the backwaters caused by an opening. The intent of this request is to determine the effects of a side-shannel opening. Proposals should realistically reflect the time required to make this determination.

b. If you are interested in participating in the Stream Alteration (Side-Channel Openings) Research Program, please submit a proposal to the U.S. Fish and Wildlife Service. Research proposals should be submitted to the Division of Contracting and General Services, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240, (If delivered in person, the proposal should be brought to Room 600, at 800 - 18th Street, NW, Washington, D.C.) by c.o.b. April 21, 1975. Mr. John H. Ourand, Contract Specialist, may be contacted on Area Code 202-343-5613 if further information is required. This rapid reply is necessary to insure that monitoring work will begin at the specific backwater sites during the spring of this year. Proposals should be submitted in 10 copies each. The technical and cost proposals must be separated to allow for technical evaluation on technical merits alone. Envelopes should be marked "Request for Proposal - RFP No. FWS 8-170."

c. A Bidders Conference will be held in the North Penthouse, Room 3068, 7th Floor, U.S. Department of the Interior Building, 18th & C Streets, NW, Washington, DC, at 9:30 a.m., on Monday, April 7, 1975, for the purpose of answering questions and providing guidance for the submission of your proposals.

d. While overall price is a factor, award of the contract resulting from this solicitation will be determined by the proposal which offers the greatest value to the Government rather than by the proposal offering the lowest price. The Government reserves the right to select the proposal which shows the greatest competence in the function areas involved. The Government reserves the right to make a single award for all items of work or multiple awards for segments of the work. The Government may award a contract, based on initial offers received, without discussion of such offers. Accordingly, proposals should be submitted initially on the most favorable terms, from a price and technical standpoint, which the offerer can submit to the Government.

e. Contractors must identify in their proposals what portion of their proposal designs, if any, are proprietary.

f. Technical proposals shall not include any reference to cost/prices. Any required cost/price data shall be included in separate documents from technical proposals.

g. The technical proposal will be a primary factor in determining award.

Evaluation of Proposals

All proposals will be evaluated and weighed as follows (in descending order of importance):

1. Compliance with the stated objectives of the proposed research project.
2. Experience and expertise of the contractor in related areas of research.
3. Methodology for completing various technical parts of the project.
4. Organization structure and equipment and facilities available for conducting the project.
5. Form of presentation of results.
6. Amount and detail of data proposed to be supplied.
7. Delivery schedule for completion of research.

1. Dr. John Walti
Water Resources Research Center
University of Minnesota
Graduate School
Minneapolis, Minnesota

2. Dr. R McConville, Ass't Prof. of Biology
St. Mary's College
Winona, Minnesota 55987

3. Dr. Calvin R. Fremling, Prof. of Biology
Winona State College
Winona, Minnesota 55987

4. Dr. James W. Eckblad
Luther College
Decorah, Iowa 52101

5. Dr. Thomas Claflin
River Studies Center
Cowley Hall
University of Wisconsin
1707 Pine
LaCrosse, Wisconsin 54601

6. Department Chairman
Department of Biological Sciences
St. Cloud State College
St. Cloud, Minnesota 56301

7. Department Chairman
Department of Biological Sciences
Mankato State College
Mankato, Minnesota 56001

8. Mr. Willis D. Fernholz
Fisheries Works Unit
Wisconsin Department of Natural Resources
Room 108, SOB
3550 Mormon Coulee Road
LaCrosse, Wisconsin 54601

9. Mr. Donald Bonneau
Iowa Conservation Commission
300 4th Street
Des Moines, Iowa 50319

10. Mr. W. J. Sidmore
Minnesota Department of Natural Resources
Fisheries Research Division
390 Centennial Building
St. Paul, Minnesota 55155

11. Dr. W. Weller, Head
Department of Entomology,
Fisheries and Wildlife
University of Minnesota
St. Paul, Minnesota 55108

12. Dr. Donald H. Rusch, Leader
Wisconsin Cooperative
Wildlife Unit
Department of Wildlife
Ecology
226 Russell Laboratories
University of Wisconsin 53706

13. Dr. Thomas S. Baskett, Leade
Missouri Cooperative
Wildlife Unit
University of Missouri
Columbia, Missouri 65201

APPENDIX E

ORIGINAL LIST OF SIDE CHANNEL SLOUGHS

EVALUATED FOR OPENING BY THE SCWG (MARCH 1975).

Attachment 4.

Great River Environmental Action Team
FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE 612-725-4690

March 17, 1975

Ratings for Side-Channel Openings; Biological, hydrological, and Recreational

Hydrological Rankings, 1-6

1. High; a good location for openings that will likely remain open.
2. Very good; a good location for openings that will likely need occasional maintenance.
3. Medium; these locations are suitable but maintenance should be expected.
4. Marginal; these sites can serve as openings but hydrological problems exist.
5. Low; further study needed to determine if water would flow; yearly maintenance necessary.
6. Poor; hydrologically, these sites will fill in very fast.

Biological Rankings

1. High; the area is in need of oxygenated water or is extremely valuable.
2. Medium; rapid deterioration of water flows or habitat is apparent.
3. Low; adequate openings exist, but there are potential problems.

Recreational Rankings

1. High; near high population center or in an area drawing heavy use.
2. Medium; some existing use or historical use has been noted.
3. Low; little used area or limited resources available for any significant use.

March 17, 1975

Side Channels Under Consideration

River Mile (State)	Name	Biological	Recreational	Hydrological	Remarks By Ir. Simons
803.4(MN)	Jackson Run	Medium	High	Marginal	
802.9(MN)	Miley Run	Medium	High	High	
798 (MN)	Sturgeon Lake Mouth	Low	High	Low	Sturgeon Lake will remain open as long as water flows into and through North Lake and Sturgeon Lake from the upper end.
790.2(WI)	Upper Lake (1)	Medium	High	Marginal	
789.8(WI)	Upper Lake (2)	Medium	High	Very Good	
789.1(WI)	Lower Lake (3)	Medium	Medium	Marginal	This opening is in a position where water will flow in either direction depending on river conditions.
787.9(WI)	Lower Lake (4)	Medium	High	Medium	
763.0(WI)	Smith Slough	High	Low	Poor	Opening of Smith Slough could do more damage than good by diverting flows from other sloughs. It would be very difficult to maintain this opening.
762.8(WI)	None	Medium	Low	Poor	
759.0(MN)	Robinson Lake	High	High	Marginal	

Side Channels Under Consideration (Cont)

River Mile (State)	Name	Biological	Recreational	Hydrological	Remarks By Dr. Simons
754.8 (MN)	Peterson Lake	Medium	High	Conditional	If extra culverts are cut to Finger Lakes, this cut would be a good one.
752.5 (MN)	Wiggle-Waggle Slough	High	Medium	Low	Aeration culverts made through dikes would be a much more effective long-lasting means of providing fresh flows to Finger Lakes than a cut through Wiggle-Waggle Slough.
748.4 (MN)	Mule Bend	High	Low	Low	Mule Bend, opened by CE in 1974, will probably require future maintenance.
747.7 (MN)	West Newton Colony (West Newton Chute downstream opening)	High	High	Low	This chute could not maintain itself because the water has to flow upstream.
747.7 (MN)	West Newton Colony (West Newton Chute upstream opening)	High	Medium	Very Good	The small opening from West Newton Chute will maintain itself for a long time if the bridge dike is opened.
747.5 (MN)	Murphys Cut	High	High	High	
746.8 (MN)	Kruger Slough	Medium	Low	Poor	

Side Channels Under Consideration (Cont)

River Mile (State)	Name	Biological	Recreational	Hydrological	Remarks By Dr. Simons
745.6(WI)	Sand Run	Low	High	Poor	Sand Run most likely draws sand into it from the main channel and would be a frequent maintenance area; Roebucks Run is a much better access route and will remain open.
744.7(MN)	Weaver Bottoms	High	High	Medium	The Weaver Bottoms Complex needs further study, but the size alone makes it an important area.
744.5(WI)	Lost Island	High	High	Low	
743.9(WI)	Lost Lake	Medium	Medium	Low	
743.7(MN)	Weaver Bottoms	Medium	Medium	Low	
736.3(WI)	Devils Cut	Medium	High	Poor	
735.0(WI)	Above Foutain City	High	Low	Marginal	The cut would have to go all the way through to Fountain City Bay to achieve a good flow.
731.4(WI)	Betsy Slough	High	Low	Marginal	

Side Channels Under Consideration (Cont)

River Mile (State)	Name	Biological	Recreational	Hydrological	Remarks By Dr. Simons
727.9(MN)	Blackbird Slough	High	High	Conditional	A culvert cut through the dike to the upper end in combination with a cut at the lower end would be good.
726.4(MN)	Straight Slough	Medium	High	Low	
724.5(WI)	Sam Gordy's Slough	Medium	High	Medium	By making use of a wing dam leading to near the entrance of this slough and notching the wing dam at the junction with shore, an opening could be made with little effort and require little maintenance.
708.5(WI)	Bullet Chute	High	High	Marginal	More study is necessary, but the opening would likely require periodic maintenance.
708 (WI)	Gibbs Flat	Low	High	Unknown	
706.4(WI)	Kramer Slough	High	High	Marginal	One of the more difficult problems to solve. A model of this slough and possible sediment stopping devices may prove useful.
689.5(WI)	Grosby Slough	Low	Low	Unknown	This is Dr. Tom Claflin's suggested dredging site and specifics of the area are generally not known.
674.0(MN)	Winneabago	Low	High	Unknown	

Side Channels Under Consideration (Cont)

River Mile (State)	Name	Biological	Recreational	Hydrological	Remarks By Dr. Simons
672.1(IA)	Ferry Slough	Low	High	Marginal	
670.5(IA)	None	High	High	Marginal	This site is just downstream from the Upper Iowa River and is heavily influenced by sediment from that river.
670.1(IA)	McDill Slough	High	High	Very Good	
669.2(IA)	Mallard Pond Slough	High	High	Marginal	
667.5(IA)	Big Lake Entrance	Low	High	Low	
665.8 - 66.9(WI)	Winneshiek Slough	Medium	High	Marginal-Low	
665.3(WI)	Henderson Slough	Medium	Medium	Low	
664.9(IA)	Hummingbird Slough	Medium	High	Marginal	
664.8(WI)	Sterns Slough	Medium	Medium	Low	
663.7(WI)	Big Slough	Low	Medium	Low	
661.4(WI)	Big Slough	Low	Medium	Low	
638.6(WI)	Ambro Slough	Low	High	Marginal	
630.0(IA)	Johnson Slough	High	High	Low	
627.6(IA)	Wyalusing Slough	Medium	High	Medium	

Additional Aeration Structures are Considered.

Lock & Dam #4 -	To the Finger Lakes not currently aerated. Additional water through these lakes may open the lower end adequately.
Lock & Dam #5 -	A second aeration culvert on the dike in the Spring Lake area.
Lock & Dam #5A -	An aeration culvert to Crooked Slough near the Minnesota City Marina. Also, an aeration culvert to Blackbird Slough
Lock & Dam #8 -	An aeration culvert near the Minnesota Shore (on the East-West Dike closest to Reno).
Lock & Dam #9 -	Aeration culverts to the Finger Lakes below the dike in addition to the existing culvert.

The following lists are sites discussed at the public meetings January 21-January 23 and January 28-30. There is some duplication of sites already discussed. The other sites have not been investigated as yet.

Side Channel Openings - Wabasha, MN

The following areas should be kept open:

- Wilcox Resort area
- Teepeota Point
- Robinson Lake
- Indian Slough
- Below Alma Dam
- Lost Island
- West Newton Chute

Side Channel Openings - Red Wing, MN

The following channels should be opened:

- Mariden Rock
- Deer Island
- Wacouta Bay
- 1st through 4th cuts
- Loon Slough
- Cannon River mouth
- Milies cut
- Jackson cut

Side Channel Openings - Lansing, IA

The following side channels are blocked and need to be opened:

- Caya Slough
- Dead Slough
- Harpers Slough
- Upper Mud Hen Cut
- Little Louie Slough
- Minnesota Slough
- Nelson Cut
- DeSota Bay
- Greymore Lake
- Sandy Point
- Upper End Pool #9
- Reno Bottoms
- DeSota Landing
- Swift Cut
- Winneabago Creek
- Stevens Slough
- First Slough
- Second Slough
- Ambro Slough
- Black Slough
- Galano Slough

Side Channel Openings - Winona, MN

The following areas are blocked and need to be opened:

- Lower end of Blackbird Slough
- Sam Gordies Slough
- Lower end of Straight Slough
- Cut off to Crooked Slough (This might be coordinated with planned dredging by Froening Grain Company. Their permit and possible EIS should be checked.)
- Slough near Jct. 43 and 35 needs opening--is now overpopulated with fish
- Blacksmith Slough near Homer
- Slough above Richmond Island
- Slough below Lock and Dam 6

Some backwaters should be closed to allow for still water for winter fishing. These areas include:

- Simpson Lake
- Twin Lakes
- Pickrel Run

Side Channel Openings - La Crosse, WI

The following backwater areas should be opened:

- Pickrel Slough
- Mud Lake
- Center Lake
- Woodhouse Slough (from Genoa to New Albin)
- Crosby Slough
- Bullet Chute
- Gibbs Slough
- Sumner Chute

APPENDIX F

EVALUATION OF POSSIBLE SIDE CHANNEL OPENING SITES PREPARED PRIOR TO THE GREAT (1974)

MHO
STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES
CENTENNIAL OFFICE BUILDING • ST. PAUL, MINNESOTA • 55155

September 18, 1974

Mr. Jack E. Hemphill, Regional Director
Bureau of Sport Fisheries and Wildlife
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

Attention: Mr. William Martin

Scott
Peters
Bland
Peterson
Vanderford
...

H.O.
Library
File
Destroy

Dear Mr. Hemphill:

At a meeting held in your offices concerning off-channel dredging on the Mississippi River, Mr. Martin asked for our written comments on two such areas to be dredged on the Minnesota side. Specifically, the Half-Moon Lake Landing - West Newton Colony Bridge (Mile 747.5) and Mule Bend - Island 42 (Mile 748.8) were suggested as sites on which channels now blocked by dredge spoil would be opened on a test basis.

Our general comments are contained for each site below:

1) Half-Moon Lake Landing - West Newton Colony Bridge. This channel leads into an important fishery habitat area, Half-Moon Lake and eventually feeds into Weaver Bottoms. Restoration of a flow through this area should improve the winter oxygen levels, allow fish passage to upstream areas for spawning, perhaps create or restore spawning areas, increase the food supply and perhaps afford more sport fishing.

2) Mule Bend - West Newton Colony Bridge. We favor reopening any existing channels that occur below, or that affect that part, of Island 42 below that line which would transect River Mile 748.7 or thereabouts. Above this area, the island contains an excellent waterfowl habitat at the present time. Additional current could eliminate some waterfowl food plants and also open up an area to boat traffic that now serves as a sanctuary. Below this area it could improve winter oxygen levels, create fish and boat passage, possibly create spawning areas and improve sport fishing.

We appreciate the opportunity to review and comment on this subject and hope our information is of use to you.

Sincerely,

Jerome H. Kuehn
Planning Administrator

JHK:rd
cc: Archie D. Chelseth
Robert Story, Nick Gulden
Richard Sternberg, Mike Casey
Roger Holmes, Charles Burrows

Mile 747.5, Half Moon Lake Landing - West Newton Colony Bridge:

A solid fill bridge serving the West Newton Colony exists across what was once a primary source of fresh water flow intothe upper end of Weaver Bottoms. In the early 1960's, two culverts through the bridge were pulled out and replaced with fill. At that time an opening existed directly from the Mississippi River at Mile 747.5 and a second smaller opening existed from West Newton Chute which joined the first opening water flow just above the birdge. Both openings are now closed, at least partially due to the blockage caused by the bridge. The larger opening was filled to approximately 1,000 feet back from the channel to a height of three to four feet above water levels. The smaller opening is evidently not subject to heavy sedimentation and developed only a 250-foot plug about 200 feet from the head of the opening.

The larger opening lies between two parcils of private land while the smaller opening is entirely within refuge lands.

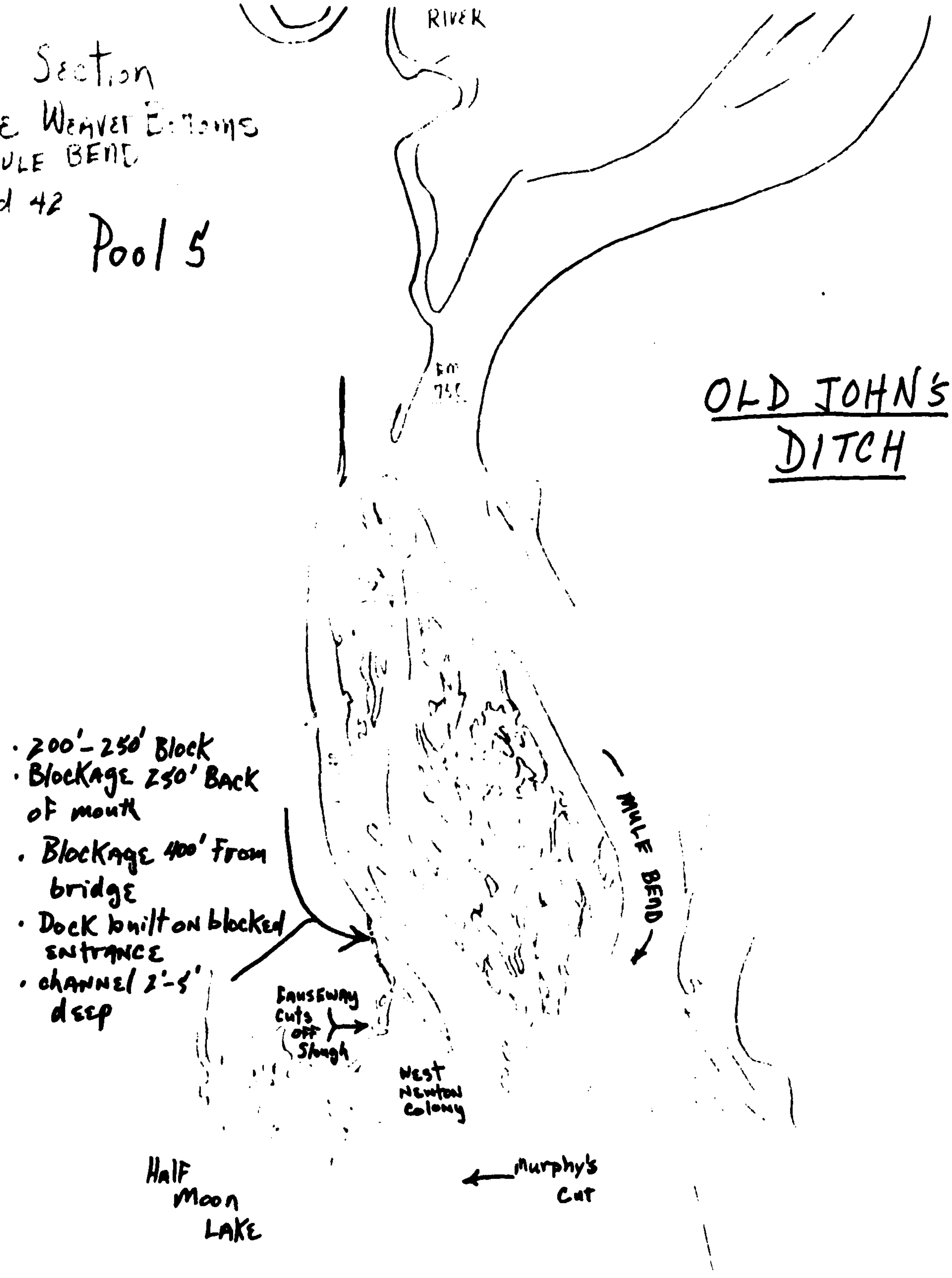
The U. S. Fish and Wildlife Service checked with the Corps of Engineers to determine if the West Newton Colony bridge was built under permit. The bridge was constructed prior to the time when permits for such activities were needed. The removal of the culverts was also accomplished prior to the time permits were required. However, riprap and concrete have been added recently without the required permit for such activities.

It may be this recent construction activity which could be used to induce installation of the needed culverts.

The proposal for this area is that the Corps of Engineers manage installation of two large culverts through the solid fill bridge, and the U. S. Fish and Wildlife Service together with the Corps will remove the 250-foot plug to a depth of four feet and width of 20 feet on the smaller opening. Spoil should be removed and used as landfill elsewhere.

Chase/Vanderford

5 Section
ive Weaver E..ms
Mule Bend
nd 42
Pool 5



August , 1974

Mile 748.8, Mule Bend - Island 42:

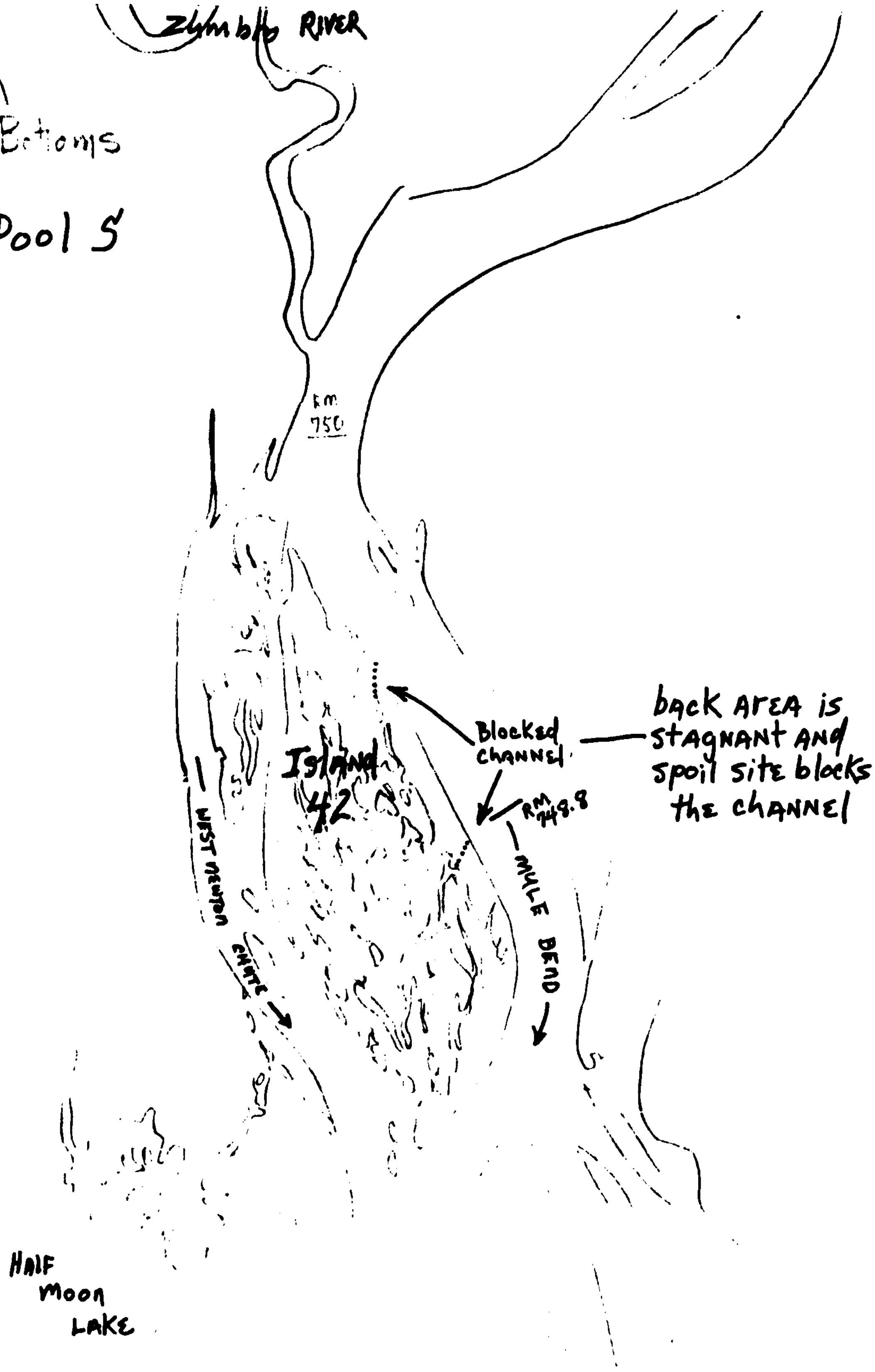
This site was once a flowing side channel into the backwater area inside Island 42. Much of the water area is now stagnating and heavily choked by aquatic vegetation. Dredging in this area was heavy in the late 1930's and early 1940's, then was not dredged again until 1959, 1964, 1971 and again this season. The recent spoil has nearly obliterated all signs of the side channel that existed in this area in the mid to late 1950's. The spoil blockage is approximately 400 feet wide and 10 feet high.

Spring floods, and to a limited degree, backwater eddies are the only means of flushing this area. Degradation is most apparent in the water areas close to the spoil bank due to oxygen depletion from decomposition of plant and animal matter. In the deeper water areas inside Island 42, stratification of the water likely occurs creating low oxygen levels as they do on other similar areas of the river. This makes the area less desirable or possible intollerable for fish and wildlife use.

The proposal for this site is removal of the blockage to a depth of five feet and width of 40 feet. Spoil removed during the reopening operation is to be side cast on the existing spoil bank on the downstream (southern) side and revegetation. The opening from the main channel should be cleared of sand on the upstream side as is necessary to prevent sand movement into the opening. The upstream side should also be revegetated to prevent sand movement into the opening.

Chase/Vanderford

s Section
ve Weaver Bottoms
MULE BEND
Id 42 Pool 5



August , 1974

Mile 735.1, Wisconsin shore:

This area just above Fountain City, Wisconsin, is an old opening into a complex system of backwater areas between the main channel and Fountain City Bay. This backwater system is influenced to a limited degree by flows through an aeriation structure on the dike of Lock and Dam No. 5 and from some movement through Kieselhorse Bay. However, due to blockage of a chute from the river, the immediate area just off the channel is stagnating from low oxygen levels. This backwater area would benefit greatly from renewed flow of oxygenated water resulting from opening the slough.

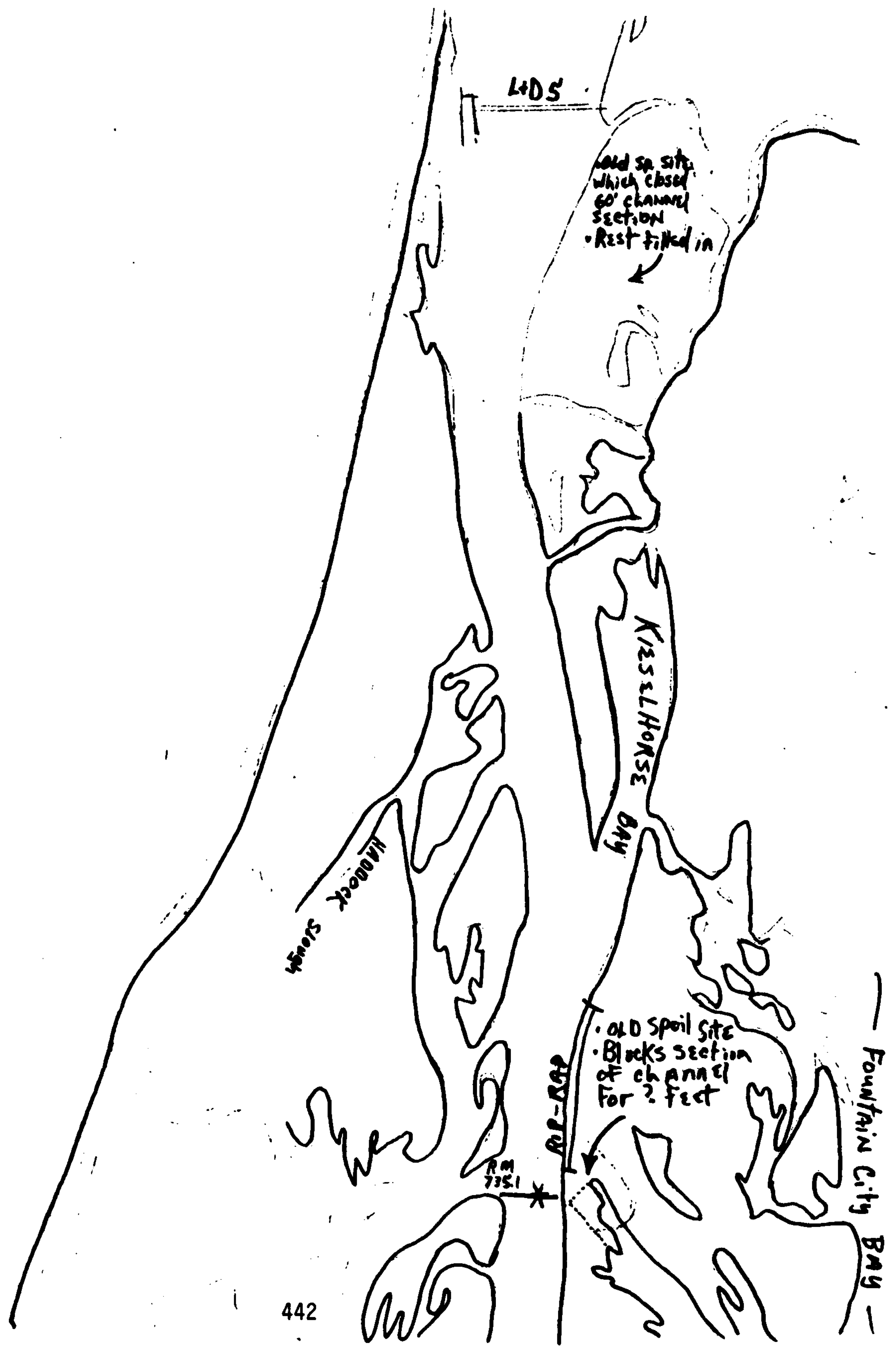
The Wisconsin shoreline is protected by riprap from near Mile 736 to 735.0. Behind the riprap at about 735.1 and then continuous downriver for over a mile are large spoil deposits. The old opening into the backwater is in the vicinity of the end of the riprap, and a 300-foot section of the slough channel is now blocked by dredge spoil. An additional 100 feet of the blocked channel will have to be dredged to insure water movement.

The proposal for this site is to reopen the side channel to the more northerly finger (old channel) to a depth of four feet and a width of 25 feet and to include removal of spoil in the downstream portion of the old channel. Spoil should be side-cast on the south side as close to existing spoil as possible and revegetated.

Chase/Vanderford

Pool 4A

upper



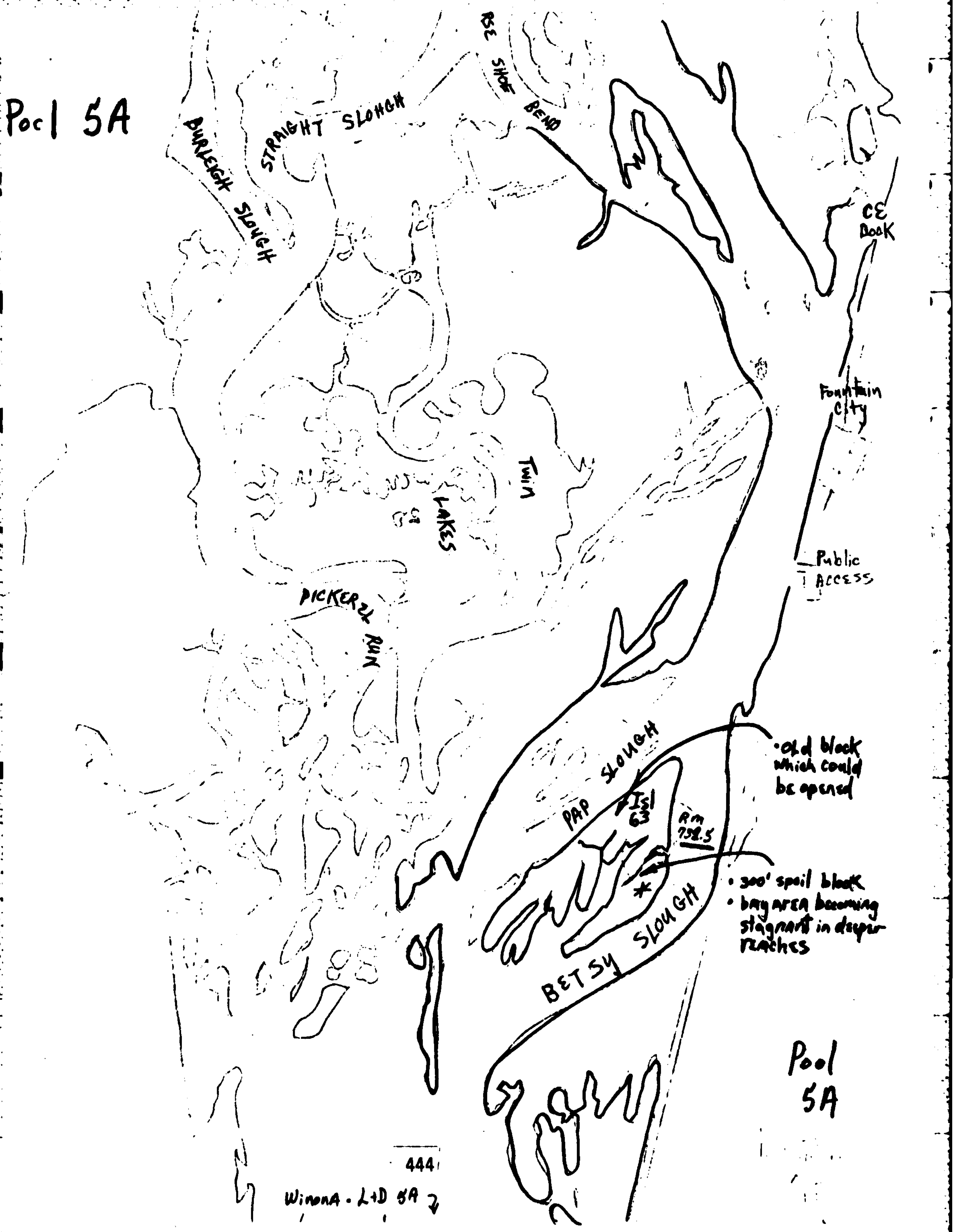
Mile 731.4, on Island 63:

Island 63 is located between Betsy Slough and Pap Slough just downstream of Fountain City. Spoil deposition in 1939, 1942 and 1948 reformed the island and thereby created a bay area in the center of the island opening downstream into Betsy Slough. This bay consists of approximately 40 acres of calm backwater which supports much rooted vegetation. Until May 1972, there was a channel bringing in fresh water to flush the bay (from the upstream section of Betsy Slough at Mile 731.5). Flow through this channel was completely stopped when spoil from the May 1972 dredge operation plugged a 300-foot section of the channel.

The spoil plug has stopped direct water flow into the bay. Spring floods and backwater eddies are presently the only means of flushing the area. The bay's quality has been reduced because of this. Degradation is most apparent in the area of the channel outlet and areas furthest from the mouth of the bay. Adjacent to the channel outlet, the water is chocked with living and dead vegetation. A surface layer of living algae, and rooted and floating plants cover a dense mass of dead and decomposing plant material. Bottom samples revealed an exclusive population of cironomid larvae (fly larvae or blood worms) indicating intolerably low dissolved-oxygen levels and very poor fish food sources.

The proposal for this site is removal of the blockage and all partial blockages upstream and downstream to a depth of four feet and a width of 30 feet. Spoil removed during the operation to be side cast on the existing spoil bank and revegetated.

Chase/Vanderford



Pocl 5A
BURLEIGH SLOUGH
STRAIGHT SLOUGH
RSE SHOE BEND
CE DOCK
Fountain City
TWIN LAKES
Public ACCESS
PICKEREL RUN
PAP SLOUGH
Isl 63
RM 758.5
• Old block which could be opened
• 300' spoil block
• bay area becoming stagnant in deeper reaches
BETSY SLOUGH
Pool 5A
444
Winona - L+D 5A 7

August , 1974

Mile 708.3, Wisconsin Shore:

A maze of sloughs connecting the Black River and Lake Onalaska to the Mississippi River exists in the area of Mile 708.3 on the Wisconsin side. The continued high quality of Lake Onalaska depends on the continued flow of water through these sloughs. At Mile 708.3 there is a slough opening from the Mississippi, and water flows through this slough into the upper end of Onalaska. However, spill-overs from sites of dredge spoil deposition have reduced the depth and width of this slough opening.

There are several openings and connecting sloughs between Onalaska and the Mississippi River. It would be difficult to directly measure the effects on Onalaska of closing any one of them. However, these sloughs do physically affect each other, and closing off one slough will subtly affect the continued flow of those remaining open. Reduced flows and resulting increased sedimentation will slowly cause closing of additional sloughs. The quality of Lake Onalasla would deteriorate more rapidly than it presently is as less and less fresh water was available to flush it out. The State of Wisconsin, the U.S. Fish and Wildlife Service, and numerous hunting and conservation groups are intent on maintaining the highest possible quality of Onalaska. This requires keeping open as many sloughs and chutes as possible.

We propose that the opening at Mile 708.3 be deepened to five feet, the depth of the slough, and widened to a minimum of 40 feet. The widening should be to the southern edge and the spoil side-cast onto existing

spoil sites and revegetated. We also recommend that the spoil site located 200 yards north of the opening be revegetated. This would prevent future filling of the slough.

Chase/Vanderford

APPENDIX G

SCWG REQUEST TO GREAT FOR

APPROVAL TO OPEN SIDE CHANNELS AT

SAM GORDY SLOUGH AND AT SNY MAGILL

GREAT

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725-4690

July 28, 1976

— Not Approved —

TO: GREAT Members

FROM: Side Channel Openings Work Group

SUBJECT: Approval of Proceeding with Work Group Openings Projects

The work group is presently preparing the public notices and work contracts necessary to accomplish several side-channel openings this season. We are also attempting to accomplish either a culvert or a siphon at L&D #5 at Fountain City Bay. Due to technical contracting problems we are not yet certain how many of the projects we will be able to accomplish with the funds remaining in our budget. However, the work group has had an established priority list for work to be accomplished since August 1, 1975, and has recently refined the priority list (see attachment).

The Side Channel Openings Work Group therefore requests GREAT approval to proceed, for the remainder of the 1976 dredging season, with project planning and work contracting for side-channel openings and culverts as outlined in the attached priority list.

As you will note in the attached priority list, openings for biological investigations are first priority and will be pursued first for the remainder of the season. The navigation opening at Ft. Snelling State Park was initiated this summer due to the commitment by the GREAT made last year to accomplish this opening. This project is underway and should be completed by August 14th.

There are several items which appear both on the O&M priority list and on either the biological or navigation opening priority list. The closing of sites listed on the O&M list can be attributed directly to barge channel operation and

therefore should be done by the Corps of Engineers. However, in the case where a site may need opening prior to the time the Corps can do the work, it should be done with GREAT funds in order of its priority on the biological or navigation openings list.

The work group realizes that our request is for a blanket authority for the remainder of the dredging season. However, we regard this work to be basic to the responsibility delegated to the work group by the Team. This blanket authority is also necessary to rapidly pursue contract procedures. This authority for the remainder of the fiscal year is warranted and may make it possible to accomplish several side-channel openings this fall. We have been delegated a specific responsibility by the Team and we have been granted a budget to pursue this work. Our request is for the technical freedom to do what we have been assigned.

Michael J. Vanderford

Michael J. Vanderford
Work Group Chairman

Attachment

July 29, 1976

GREAT

SIDE-CHANNEL OPENINGS WORK GROUP
PROJECT PRIORITY LIST *

1st Priority: Culverts and Side-Channel Openings for Biological Investigations

Priority 1. Culvert - Lock and Dam 5 into Fountain City Bay
2. Side-Channel Opening - Sam Gordy Slough
3. Side-Channel Opening - Kieselhorse-Fountain City

2nd Priority: Side-Channel Openings for Recreational Benefit and Culverts for Biological Benefit

Side-Channel Openings

Priority 1. Buffalo City Access (Pool 5) ++ Accomplished
2. Ft. Snelling State Park Channel (Pool 2) +++ Underway
3. McDonald Slough (Pool 10)
4. Sny McGill (Pool 10)
5. Bullet Chute (Pool 7)
6. Blackbird Slough (Pool 6)
7. Jackson Run (Pool 3)
8. Ferry Slough (Pool 9)

Culverts

Priority 1. Lock and Dam 10 - Waterfowl Ponds
2. Lock and Dam 5A - Crooked Slough
3. Lock and Dam 4 - Finger Lakes
4. Lock and Dam 8 - Reno Bottoms

O&M Project Sites: Side-Channel Sites Which Have Apparently Been Closed Due to Channel Operation or Maintenance

Priority 1. Wyalusing Slough (Pool 10)
2. Blackbird Slough (Pool 6)
3. Swift Slough (Pool 11)
4. Kieselhorse-Fountain City Bay (Pool 5A)
5. Bullet Chute (Pool 7)
6. Ferry Slough (Pool 9)

* This revised priority list developed at the SCOWG meeting of June 29, 1976.

ATTACHMENT 1.

August 1, 1975

OUTLINE:
RECOMMENDATIONS OF THE SIDE-CHANNEL OPENINGS WORK GROUP

1st Priority: Culverts and Side-Channel Openings for Biological Investigations

Priority 1. Culvert A - Lock and Dam 5 into Fountain City Bay
2. Colvert B - Lock and Dam 5 into Fountain City Bay
3. Side Channel Opening - Sam Gordy Slough
4. Side-Channel Opening - Kieselhorse-Fountain City

2nd Priority: Side Channel Openings for Recreational Benefit and Culverts for Biological Benefit

Side Channel Openings

Priority 1. Buffalo City Access (Pool 5)
2. Ft. Snelling State Park Channel (Pool 2)
3. *4th Cut into Lower Lake (Pool 4)
4. McDonald Slough (Pool 10)
5. *Bullet Chute (Pool 7)
6. *Blackbird Slough (Pool 6)
7. Glen Lake (Pool 10)
8. Jackson Run (Pool 3)
9. Johnson Slough (Pool 10)
10. *Ferry Slough (Pool 9)

Culverts

Priority 1. Lock and Dam 10 - Waterfowl Ponds
2. Lock and Dam 5A - Crooked Slough
3. Lock and Dam 4 - Finger Lakes
4. Lock and Dam 8 - Reno Bottoms
5. Lock and Dam 5A - Blackbird Slough

* Sites where dredge spoil has been the obvious cause of the channel alteration.

APPENDIX H

ANNOUNCEMENT & AGENDA FOR INSPECTION

TOUR OF SITES PROPOSED FOR MODIFICATIONS

(JUNE 1975)

Chase

GREAT

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE 612-725-4590

June 2, 1975

TO: Side-Channel Openings Work Group

FROM: Work Group Chairman

SUBJECT: Inspection Tour of Sites Proposed for Openings for Recreational Benefit

The tour of proposed recreational openings has been set for June 9, 10, and 11. The starting time is 1:00 p.m. at the Iowa Conservation Commission's fish hatchery at Guttenburg, Iowa. Conclusion will be at approximately 3:00 p.m. on Wednesday in Minneapolis. Three boats will be provided at each site of the tour as necessary.

The purpose of the tour is to provide each member of the work group a firsthand opportunity to evaluate the opening sites proposed for this year. Therefore, it is important that each member participate in the whole tour. However, if you cannot make all three days, the attached schedule gives the approximate time that we will be at any given site.

In regard to the schedule, it is quite important that the set timetable be kept. As you will note, there is very little slack time in the schedule, and any overrun at one location will mean that less time or no time can be allowed for another site. Time has been allowed at each site for seeing and/or walking the site and a brief discussion of the possible benefits or problems associated with a possible recreation opening. Final decision to recommend or not to recommend a culvert or opening will be made at our next work group meeting. Therefore, a complete discussion on site is not necessary.

I would refer each work group member to "Attachment 3" of the work group's plan-of-action. This is the project criteria which the work group agreed should be followed in evaluating side-channel openings. The right-hand portion refers to recreation openings.

Please contact Michael Vanderford (612/725-3533) if you have any questions regarding the site tour.

Michael J Vanderford

for Joseph F. Scott, Jr.

Attachment

RECREATION-OPENINGS SITE INSPECTION ITINERARY

Monday June 9	Arrive Guttenburg - 1:00 p.m.
	inspect LD #10 Culvert site - 1 hour
	Arrive Sny Magill Landing (30 miles north thru McGregor) - 2:30 p.m.
	inspect Wyalusing Slough (I) 627.6, pool 10
	Arrive Harpers Ferry (18 miles north) - 4:00 p.m.
	inspect McDonald-Dead Slough (I) 646.5, pool 10
	Arrive Lansing (16 miles north) - 5:30 p.m.
	Dinner at Riv-Aire Restaurant
	inspect Hummingbird Slough (I) 664.9, pool 9
	inspect Ferry Slough (I) 672.1, pool 9
	Arrive Reno (20 miles north) - 9:00 p.m.
	inspect LD #8 Culvert site
	Arrive LaCrosse (20 miles north) - 10:00 p.m.
	Overnight at the Holiday Inn (or other well-known establishment)
Tuesday June 10	Arrive Dresbach (5 miles north) - 8:00 a.m.
	inspect Bullet Chute (W) 708.5, pool 7
	Arrive Winona - Latsch Island (25 miles north) - 9:30 a.m.
	inspect Blackbird Slough (M) 727.9, pool 6
	inspect LD #5A Culvert site (into Blackbird Slough)
	inspect Straight Slough (M) 726.4, pool 6
	Lunch in Winona

Tuesday June 10 (cont.)	Arrive Minnesota City (5 miles north) - 1:00 p.m.
	inspect Minnesota City Boat Club (M) 731.0, pool 5A
	inspect LD #5A Culvert site (into Crooked Slough)
	Arrive Weaver Landing (10 miles north) - 2:30 p.m.
	inspect Sand Run (W) 745.6, pool 5
	Arrive Kellogg (12 miles north) - 5:00 p.m.
	Beer stop
	Arrive Western Edge LD #4 (northeast of Kellogg) - 6:00 p.m.
	inspect LD #4 Culvert/Diversion site
	Arrive Wabasha (10 miles north) - 7:30 p.m.
	inspect Crats Island - Robinson Lake Site (M) 759.0, pool 4
	Arrive Red Wing (30 miles north) - 9:30 p.m.
	Dinner at Nybo's
	Overnight at the Sterling Motel
Wednesday June 11	Arrive Colville Park in Red Wing - 8:00 a.m.
	inspect Lower Lake Slough (W) 787.9, pool 4
	Arrive North Lake Landing (20 miles north) - 10:00 a.m.
	inspect Jackson-Miley Runs (M) 803, pool 3
	Arrive Hastings - 12:00 noon
	Lunch
	Arrive Fort Snelling State Park (40 miles northwest) - 1:30 p.m.
	inspect Pike Island Boat Harbor (M) Minnesota River, pool 2
	Conclude tour at 3:00 p.m.

Tuesday June 10 (cont.)

Arrive Minnesota City (5 miles north) - 1:00 p.m.

inspect Minnesota City Boat Club (M) 731.0, pool 5A

inspect LD #5A Culvert site (into Crooked Slough)

Arrive Weaver Landing (10 miles north) - 2:30 p.m.

inspect Sand Run (W) 745.6, pool 5

Arrive Kellogg (12 miles north) - 5:00 p.m.

Beer stop

Arrive Western Edge LD #4 (northeast of Kellogg) - 6:00 p.m.

inspect LD #4 Culvert/Diversion site

Arrive Wabasha (10 miles north) - 7:30 p.m.

inspect Crats Island - Robinson Lake Site (M) 759.0, pool 4

Arrive Red Wing (30 miles north) - 9:30 p.m.

Dinner at Nybo's

Overnight at the Sterling Motel

Wednesday June 11

Arrive Colville Park in Red Wing - 8:00 a.m.

inspect Lower Lake Slough (W) 787.9, pool 4

Arrive North Lake Landing (20 miles north) - 10:00 a.m.

inspect Jackson-Miley Runs (M) 803, pool 3

Arrive Hastings - 12:00 noon

Lunch

Arrive Fort Snelling State Park (40 miles northwest) - 1:30 p.m.

inspect Pike Island Boat Harbor (M) Minnesota River, pool 2

Conclude tour at 3:00 p.m.

APPENDIX I

SCWG LIST OF RECOMMENDED SITES FOR

SIDE CHANNEL OPENINGS AND CULVERTS

(AUGUST 1975)

APPENDIX I

SCWG LIST OF RECOMMENDED SITES FOR

SIDE CHANNEL OPENINGS AND CULVERTS

(AUGUST 1975)

GREAT

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725-4690

August 1, 1975

TO: Work Group Chairmen, GREAT Cochairmen

FROM: Side-Channel Openings Work Group

SUBJECT: Recommended Sites for Side Channel Openings and Culverts from Minneapolis to Guttenburg

The following listed sites are recommended by the Side-Channel Openings Work Group for side-channel openings or culvert structures. These recommendations are the result of input from personnel of the resource agencies and private citizens and come after an inspection of each site considered.

It is requested that openings be made at as many of the sites as possible this year. However, the work group realizes that the GREAT budget may not allow for all of the projects, and we have, therefore, prioritized the sites submitted to you.

There are three categories of projects that should be accomplished. The first category, culverts and openings for biological investigations, has first priority, although the projects required for these sites are needed next year rather than this year. These openings are required as part of the research being conducted to determine the biological effects of side-channel openings. No priority ranking is given the sites within this category, for all sites listed will require an opening or culvert project.

The remaining openings are divided into two categories, although one does not have priority over the other. One category is culverts. Culverts need to be constructed at several locations for biological benefit. Deficiencies in the design of the dams and dikes at these sites have caused the adjacent downstream areas to become stagnant and hypereutrophic. The exception to this is the proposed project area below L&D #10. This area is recommended for a culvert to take full advantage of the area's potential for waterfowl enhancement. Culverts are unquestionably needed to restore suitable habitat for fish and waterfowl to the other areas, however. The list of recommended sites for culverts has been prioritized.

The remaining category is side-channel openings for recreational benefit. The sites in this category have been prioritized and openings should be cut this year. Although the side-channel openings do not have general priority over the culvert projects, the first two priorities of the side-channel list do have priority over any other project in either group. Sites on this list which have obviously been altered by dredge spoil are indicated by an asterisk. It is our understanding that the Corps of Engineers will make cuts at several of these sites out of their own O&M budget. Should it be impossible to do all of the projects recommended this year, the projects not accomplished this year should become top priorities next year.

The recommended sites are as follows (reference maps are attached):

I. Culverts and Openings for Biological Investigations

1. Culvert - Fountain City Bay

   Thru dam 5 at RM 740.5, breaching to be thru dike which runs perpendicular to channel toward Cochrane, Wisconsin. Calvin Fremling and David McConville will provide details as to volume of flow required.

2. Culvert - Fountain City Bay

   Thru dam 5 at RM 740, project to enlarge and lower existing culvert thru dam 5. Fremling and McConville will provide recommendation for volume needed.

3. Side-Channel Opening - Sam Gordy Slough

   At RM 724.5, project to dredge opening into the mouth of Sam Gordy Slough, spoil placement site has not been worked out.

4. Side-Channel Opening into Fountain City Bay

   The work of Fremling and McConville has already established that there is a need to dredge a side-channel opening into Fountain City Bay downstream of L&D #5. However, at present, not enough information has been gathered to determine the best site for this opening. Therefore, the work group recommends that a cut be made in this area next year at a site to be designated by the Winona State/St. Mary's College Team.

   It is suggested that the two culverts required for the Fountain City Bay area be funded by Corps of Engineers O&M budget rather than GREAT funds. The area is suffering due to being cut off from freshwater flows by L&D #5. Therefore, a deficiency in the design of the dike work is apparent. It is understood that design planning for such

culverts is time consuming. Therefore, it is suggested that design work for the culverts begin this year although projects will not be required until next year.

II. Culverts for Biological Benefit

1. Lock and Dam 10 - Waterfowl Production Area

A gated culvert or siphon structure is needed to transform a complex of old fish hatchery ponds at L&D #10 into a highly productive waterfowl resting and feeding area. A siphon or gated culvert would allow for the control of water levels in the many ponds, and Bob Wilson of the Upper Mississippi Refuge would take responsibility for operating the culvert or siphon.

2. Lock and Dam 5A - Crooked Slough

A gated culvert is needed thru L&D #5A near Minnesota City to provide water and dissolved oxygen to Crooked Slough. A second existing culvert owned by the City of Winona would be used in conjunction with the recommended culvert to enhance fish and waterfowl use of the area. Staff from the Upper Mississippi Refuge would be responsible for managing the culvert gates.

3. Lock and Dam 4 - Finger Lakes

A culvert is needed to assure oxygen levels in several of the finger lakes just below L&D #4. An existing culvert into the finger lake just east of Clear Lake has proven inadequate to prevent the remaining four fingers from becoming anaerobic during the summer and winter. This recommendation is to put a culvert into the second and third finger by constructing one dam breach and creating a "Y" split with galvonized pipe to reach the two lakes.

4. Lock and Dam 8 - Reno Bottoms

Two culverts exist presently thru L&D #8 into the Reno Bottoms area. However, these culverts, combined, provide only 120 cfs of water into one of the largest backwater-slough areas on the Mississippi. An additional or enlarged culvert is recommended for the left submersible dam to assure water supplies to many marsh and slough areas which presently go dry in the summer. Such additional flowages would also provide boat access into this highly productive fishing area during the summer.

5. Lock and Dam 5A - Blackbird Slough

A culvert breaching L&D #5A into Blackbird Slough is recommended to prevent the waters of this heavily used fishing area from becoming depleted of oxygen in the winter.

III. Side-Channel Openings for Recreational Benefit

1. Buffalo City Access (Buffalo City, Wisconsin) - RM 745.5

The first priority of the work group is to provide an access to the main channel of the Mississippi from Buffalo City. The recommendation is to dredge a gap between two islands just off shore of the city to allow boat passage thru Belvidere Slough to Roebuck's Run. Approximately 20,000 cubic yards of sediment will need to be removed. It is recommended that the cut be 6 feet deep and 30 feet wide. The work group is contacting Buffalo County and Buffalo City to find an on-land disposal area.

2. Ft. Snelling State Park Channel (Twin Cities, Minnesota) - Minnesota River

The second priority of the work group is to cut a navigation channel for recreational craft into the old meander of the Minnesota River between Pike Island and Picnic Island at Ft. Snelling State Park. The purpose of the cut is to provide an access to and from the state park by way of the Minnesota and Mississippi Rivers. This cut will provide a short-term remedy to the problem of providing access.

A long-term solution is being pursued apart from GREAT by the Minnesota DNR and the Corps of Engineers. This long-term solution will likely come through a small harbor project jointly funded by the state and the Corps. Such matters as removing the upstream causeway and placing deflectors to direct water into the meander will be handled in this latter phase.

The Minnesota DNR has developed plans and obtained funds to develop a dock and boat launching facility on the channel to be dredged as soon as the project is complete. An estimated 18,000 yards of silt and clay will need to be removed to create a canal 6 feet deep along the southern half of the canal. Spoil will be placed on state park property just below the bluffs of historic Ft. Snelling.

3. *Fourth Cut into Lower Lake (Red Wing, Minnesota) - RM 787.8

The third priority is to remove a plug at the mouth of the 4th cut into Lower Lake just downstream from Colville Park in Red Wing. This plug blocks access to an area heavily used by fishermen and the work group has received numerous requests for this project. A 6-foot depth and 30-foot width is recommended. The Red Wing landfill is in need of capping material and probably would take the project spoil for that purpose.

4. McDonald Slough (Harper's Ferry, Iowa) - RM 646.5

The fourth priority is to remove a small plug in McDonald Slough which presently blocks access to the river from Harper's Ferry. The plug to be removed is estimated to be 100 feet long. It is recommended that a channel 6 feet deep and 30 feet wide be cut. No recommendations were made concerning spoil deposition.

5. *Bullet Chute (Black River, Wisconsin) - RM 708.7

The fifth priority is to remove a plug at the junction of the Mississippi River and Bullet Chute. The plug to be removed is estimated to be 3,200 yards; however, the spoil will have to be removed from the area. It is recommended that a channel be dug 6 feet deep and 30 feet wide. The blockage restricts access to Lake Onalaska by recreational boaters as well as reducing the amount of water flowing into the lake. In addition to removing the plug, it is strongly recommended that the shoreline of the river above Bullet Chute be riprapped.

6. *Blackbird Slough (Winona, Minnesota) - Lock and Dam 5A

The sixth priority is to dredge the natural channel opening into Blackbird Slough from the Mississippi River. This area has been heavily used by fishermen; however, access is becoming very difficult. The channel to be dredged should be 6 feet deep and 30 feet wide. A recommended spoil deposition site will depend on placement of riprap along the river side of the peninsula which forms Blackbird Slough. It is recommended that this bank be fully riprapped to protect the peninsula from propwash. If this is to be done, the dredge spoil from the natural channel could be used to fill in the cut recently created in the peninsula by propwashing. If riprapping is not possible, the spoil will have to be barged to Winona's industrial park.

7. Glen Lake (Wyalusing, Wisconsin) - RM 629.3

The seventh priority is to reopen the channel into Glen Lake from the Mississippi River. This channel will provide an access from Wyalusing State Park to the river and will, thereby, greatly increase recreational opportunities in the area. A channel 6 feet deep is recommended with a width equal to the natural breadth of the slough. No recommendation was made concerning spoil placement.

8. Jackson Run (North Lake, Minnesota) - RM 803.5

The eighth priority is to reopen Jackson Run which runs from the Mississippi to North Lake near Diamond Bluff, Wisconsin.

The cut would provide access to a prime duck hunting area which is now very difficult to reach. Primarily, the project will require clearing and snagging of the many logs and branches at the river junction of the run. Dredging may be required in addition, but it is expected that this would be a minor portion of the project. A channel 6 feet deep and 30 feet wide is desired.

9. Johnson Slough (Clayton County, Iowa) - RM 629.9

   The ninth priority is to remove the shoreward 250 feet of the wing dam just above the inlet into Johnson Slough and remove the center sections of the logs which lie across the slough. The opening would provide access to a section of the slough which has prime fish habitat as well as providing additional water supplies to Johnson and Wyalusing Sloughs. It would not be necessary to dredge any of the slough. The center sections cut from the blocking logs should be allowed to float down the slough.

10. *Ferry Slough (Victory, Wisconsin) - RM 672.1

    The tenth priority is to remove a small plug from the inlet of Ferry Slough just upstream from the mouth of the Upper Iowa River. The plug restricts access to a maze of backwater fishing and hunting areas which normally could be reached from three close-by public boat landings. The plug is approximately 30 feet wide and twice as long. The recommended cut is 30 feet wide and 6 feet deep. No recommendation was made concerning placement of spoil.

The priorities established for the side-channel openings and culvert projects were based on need and public benefit rather than on costs or feasibilities of particular projects. Originally, the work group desired to recommend at least one opening in each pool. However, it became evident that priorities based on need would not allow this. The priority ratings are subject to change should new information be revealed.

Engineering details have not been included in our recommendation. It is recommended that Dr. Daryl Simons (Colorado State University) be consulted on each project. Dr. Simons' advice on design and alignment of each cut to be made should be considered the recommendation of the work group.

Monitoring, on a limited scale, will be conducted in the area of each project, where appropriate. Dissolved oxygen will be the primary parameter watched, but other parameters will be included. Various members of the work group will be conducting the monitoring.

<u>Mud Cat - National Car Rental</u>

National Car Rental has contacted the work group concerning the use of a small dredge developed by National called the Mud Cat in our work. The

Mud Cat Division presented the capabilities of their hydraulic dredge to the work group and has offered a 5-day demonstration of the machine at the Ft. Snelling State Park Channel. The Mud Cat can work in 27 inches of water and cut a channel as small as 8 feet wide. The dredge can be rented (2 months minimum) or purchased. The work group is considering recommending the rental of a Mud Cat to undertake the opening projects at Ft. Snelling and Buffalo City.

Joseph F. Scott, Jr.

Joseph F. Scott, Jr., Chairman
Side-Channel Opening Work Group

Attachments

ATTACHMENT 1.

August 1, 1975

OUTLINE:
RECOMMENDATIONS OF THE SIDE-CHANNEL
OPENINGS WORK GROUP

1st Priority: Culverts and Side-Channel Openings for Biological Investigations

Priority 1. Culvert A - Lock and Dam 5 into Fountain City Bay
2. Colvert B - Lock and Dam 5 into Fountain City Bay
3. Side Channel Opening - Sam Gordy Slough
4. Side-Channel Opening - Kieselhorse-Fountain City

2nd Priority: Side Channel Openings for Recreational Benefit and Culverts for Biological Benefit

Side Channel Openings

Priority 1. Buffalo City Access (Pool 5)
2. Ft. Snelling State Park Channel (Pool 2)
3. *4th Cut into Lower Lake (Pool 4)
4. McDonald Slough (Pool 10)
5. *Bullet Chute (Pool 7)
6. *Blackbird Slough (Pool 6)
7. Glen Lake (Pool 10)
8. Jackson Run (Pool 3)
9. Johnson Slough (Pool 10)
10. *Ferry Slough (Pool 9)

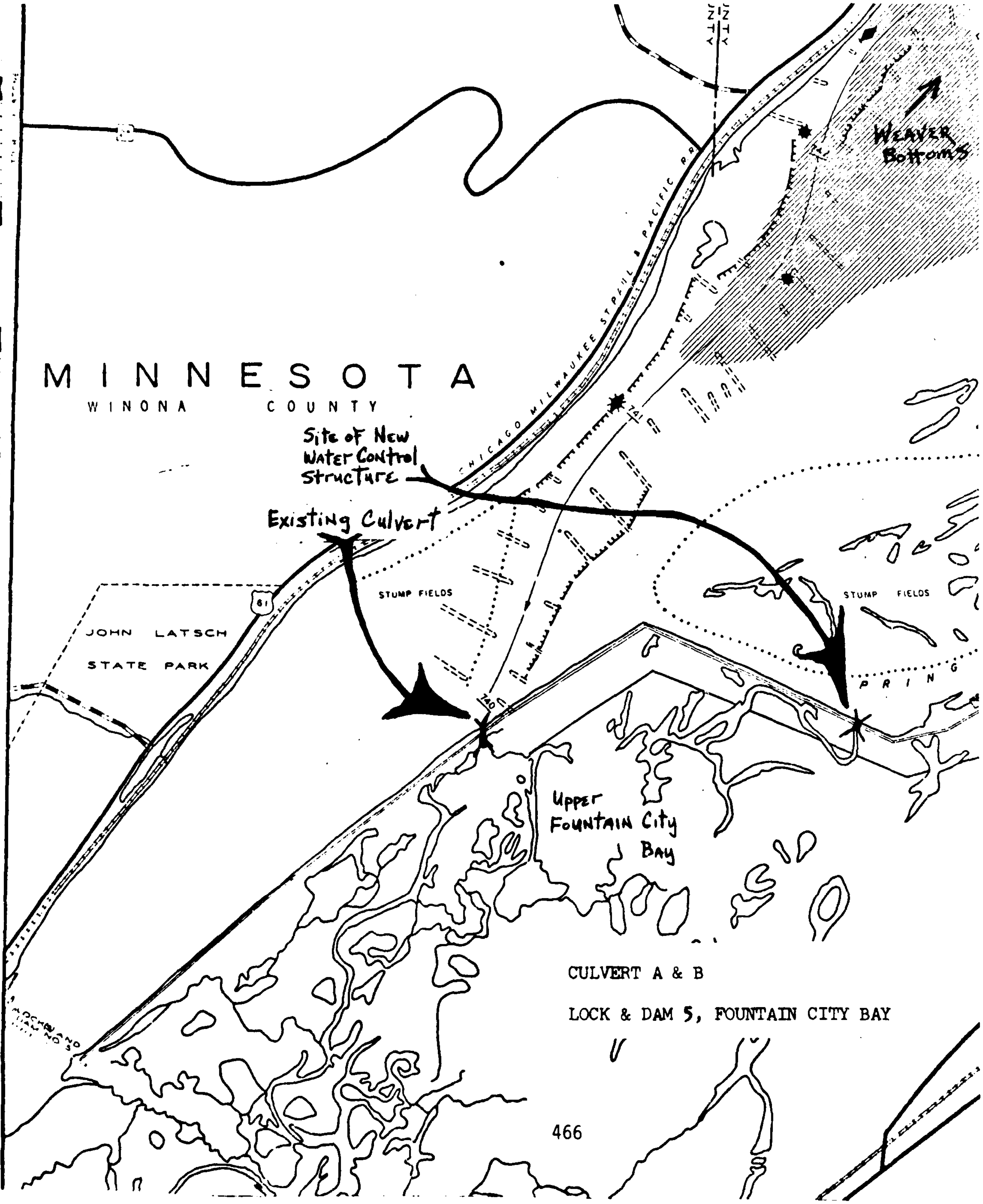
Culverts

Priority 1. Lock and Dam 10 - Waterfowl Ponds
2. Lock and Dam 5A - Crooked Slough
3. Lock and Dam 4 - Finger Lakes
4. Lock and Dam 8 - Reno Bottoms
5. Lock and Dam 5A - Blackbird Slough

* Sites where dredge spoil has been the obvious cause of the channel alteration.

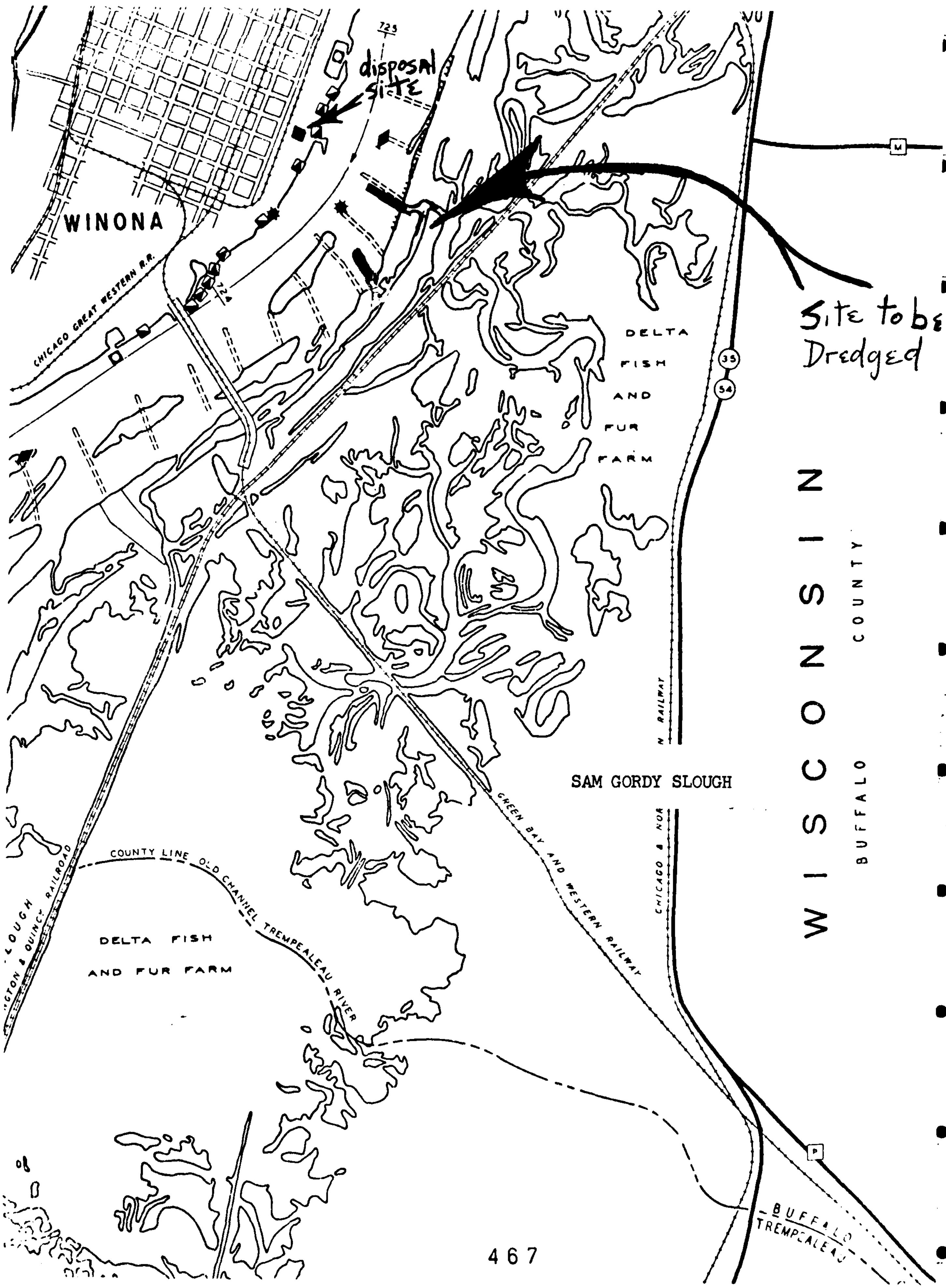
ATTACHMENT 2.

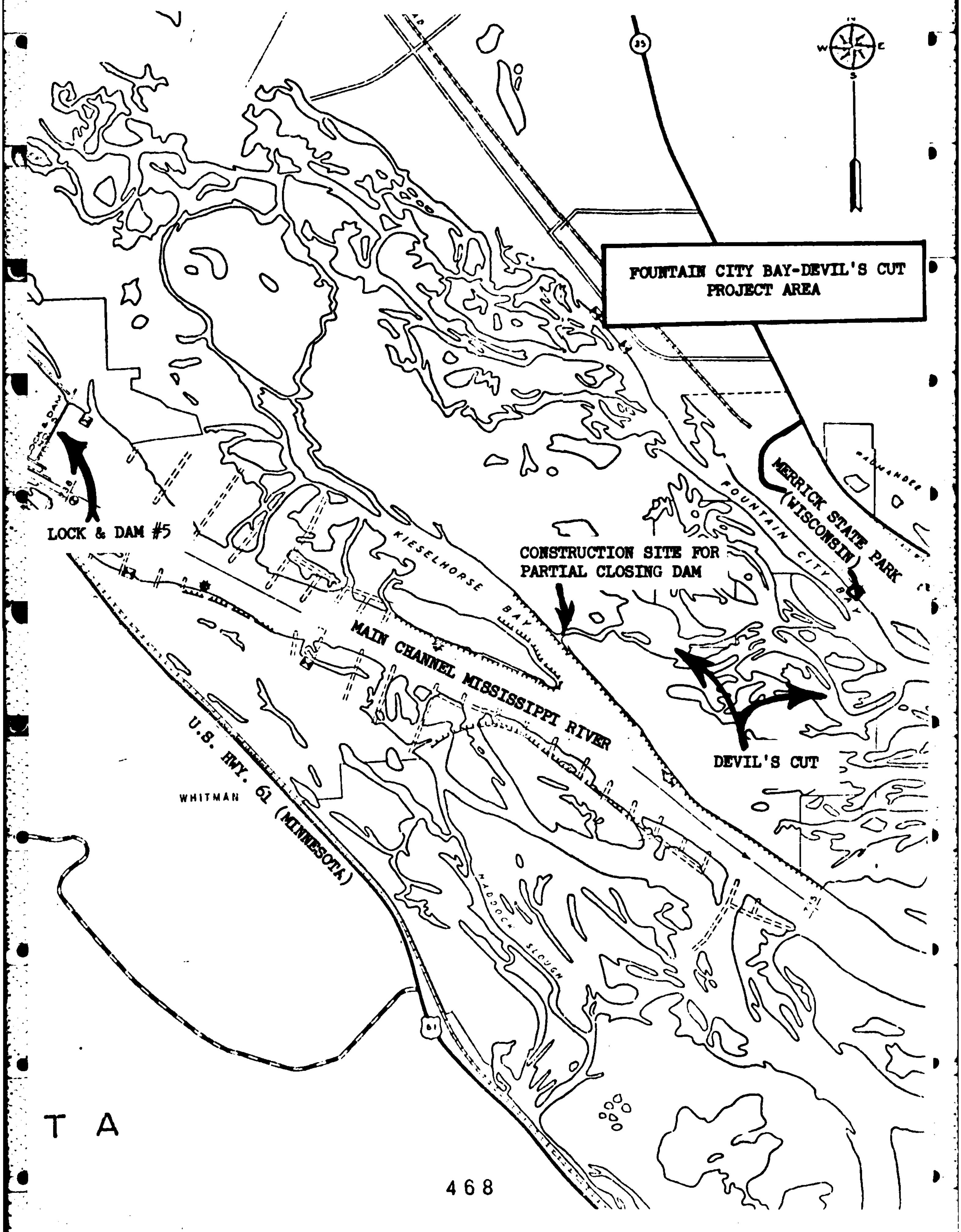
MAPS OF PROJECT LOCATIONS

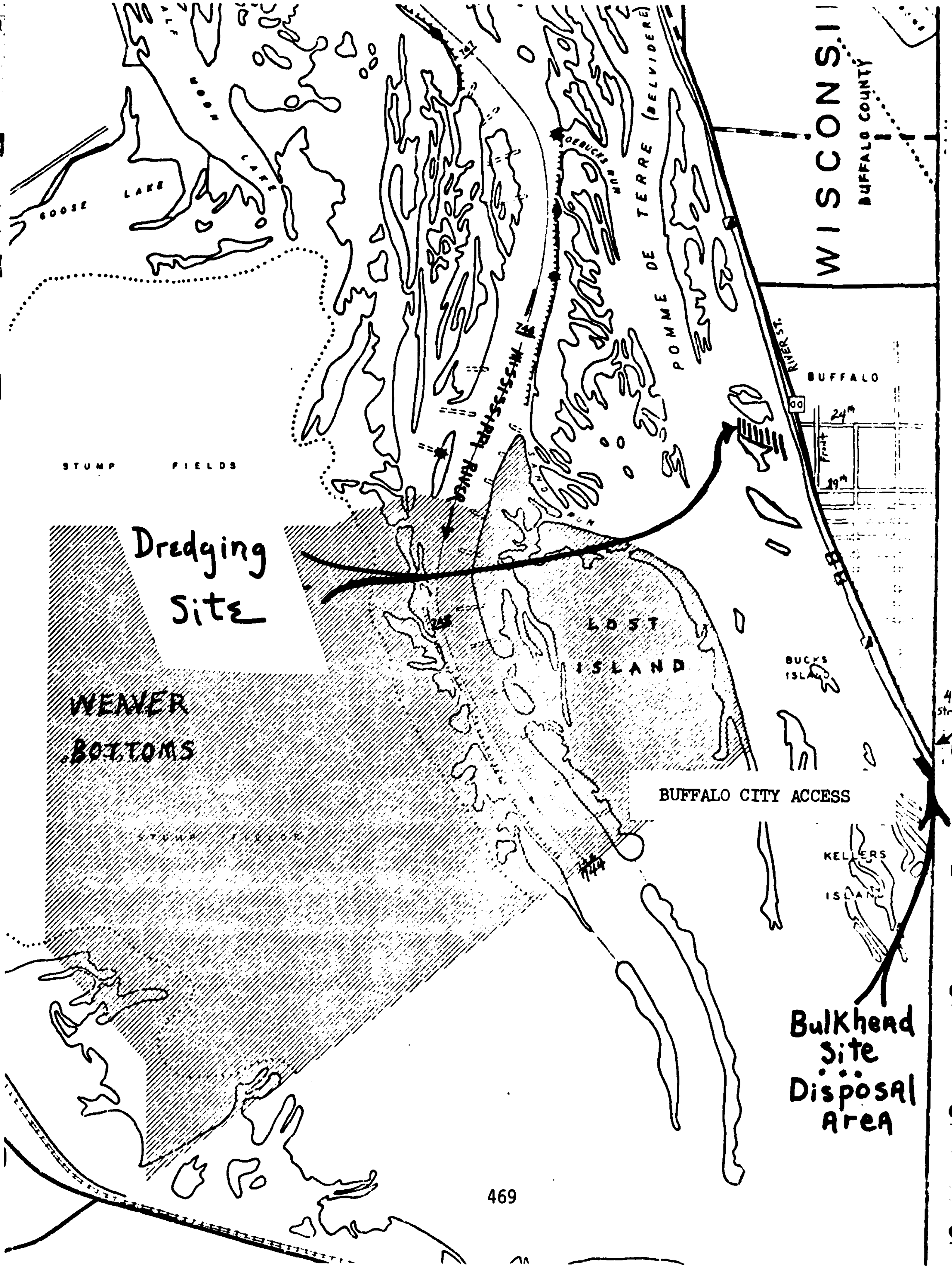


CULVERT A & B

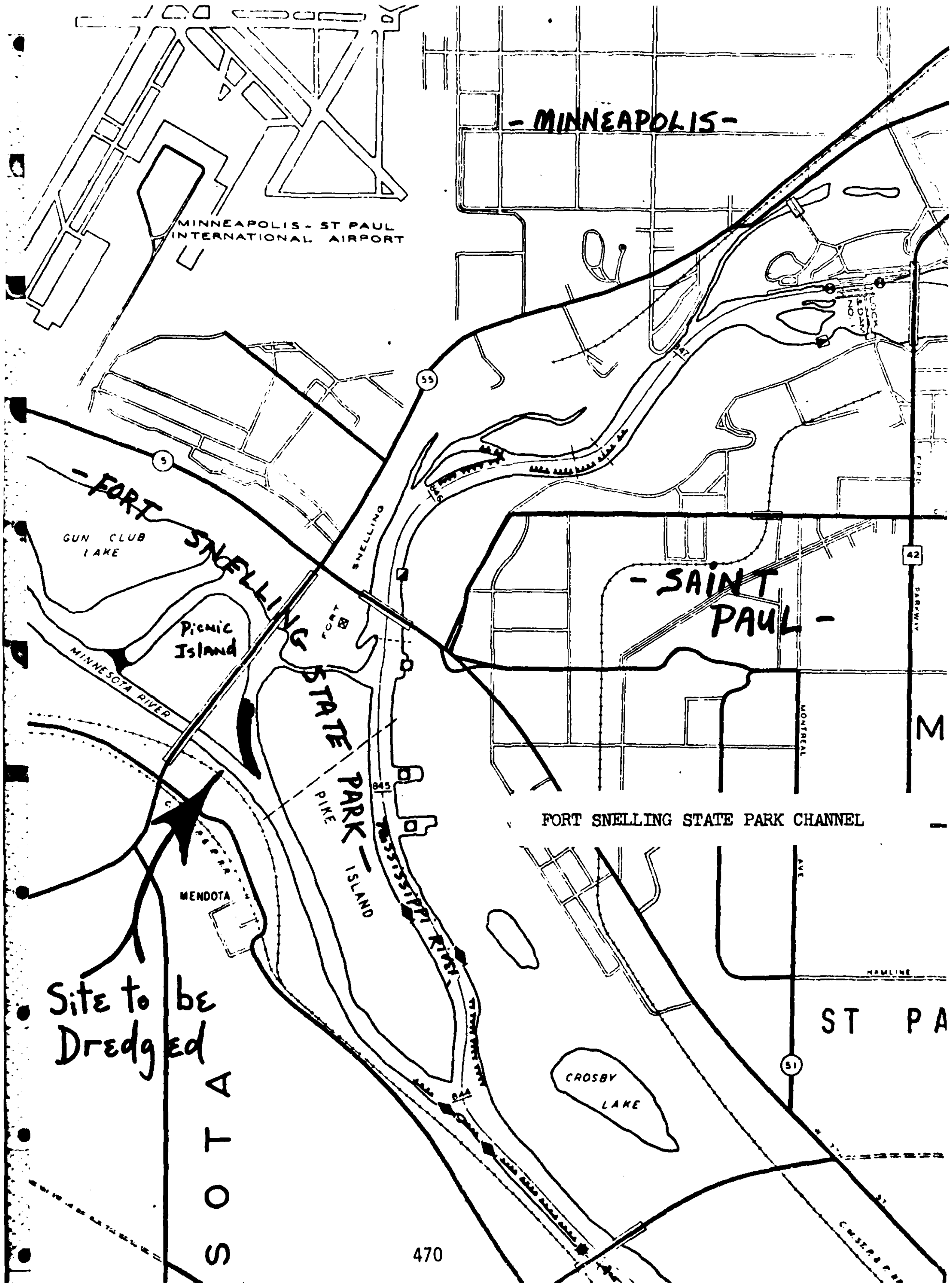
LOCK & DAM 5, FOUNTAIN CITY BAY


disposal site
Site to be Dredged
WINONA
CHICAGO GREAT WESTERN R.R.
725
724
DELTA
FISH
AND
FUR
FARM
SAM GORDY SLOUGH
GREEN BAY AND WESTERN RAILWAY
CHICAGO & NOR N RAILWAY
WISCONSIN
BUFFALO COUNTY
COUNTY LINE OLD CHANNEL TREMPEALEAU RIVER
DELTA FISH
AND FUR FARM
35
54
M
P
BUFFALO
TREMPEALEAU

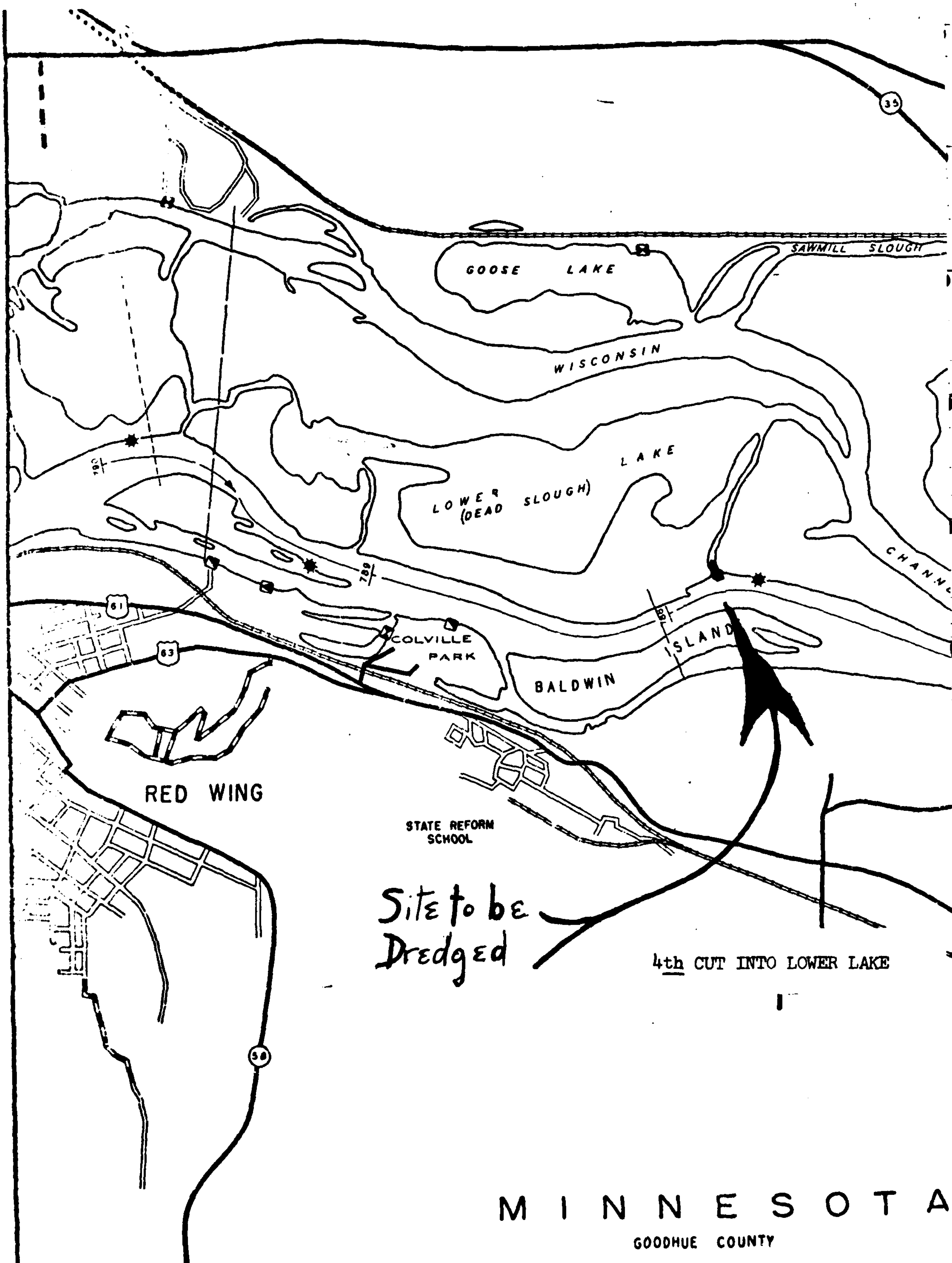

FOUNTAIN CITY BAY-DEVIL'S CUT
PROJECT AREA
LOCK & DAM #5
KIESELHORSE BAY
CONSTRUCTION SITE FOR
PARTIAL CLOSING DAM
MAIN CHANNEL MISSISSIPPI RIVER
FOUNTAIN CITY BAY
MERRICK STATE PARK
(WISCONSIN)
DEVIL'S CUT
U.S. HWY. 61 (MINNESOTA)
WHITMAN
MADDOCK SLOUGH
T A



WISCONSIN
BUFFALO COUNTY
GOOSE LAKE
POMME DE TERRE (BELVIDERE)
MISSISSIPPI RIVER
RIVER ST.
BUFFALO
STUMP FIELDS
Dredging Site
LOST ISLAND
BUCKS ISLAND
WEAVER BOTTOMS
BUFFALO CITY ACCESS
KELLERS ISLAND
Bulkhead Site
Disposal Area

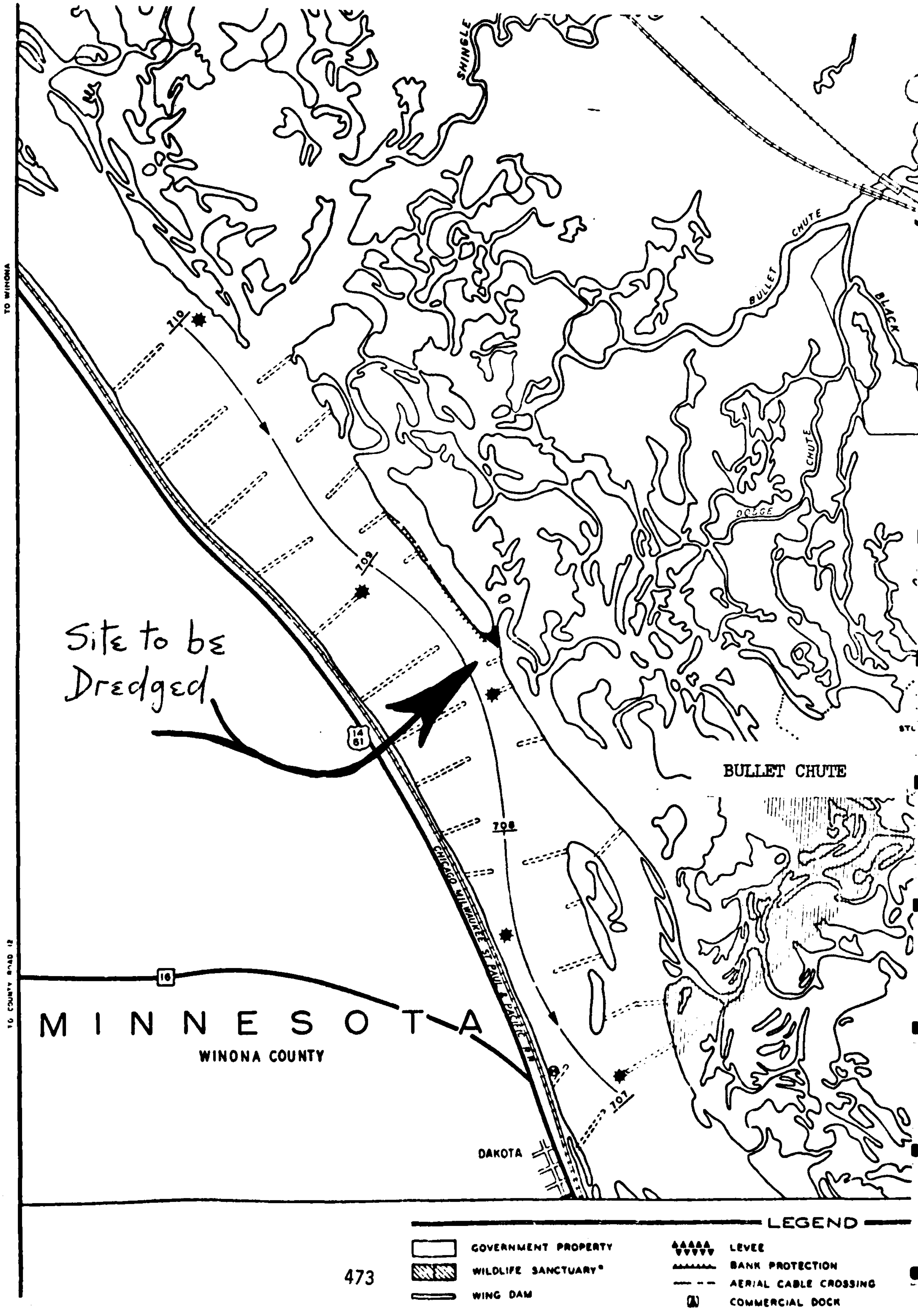


FORT SNELLING STATE PARK CHANNEL

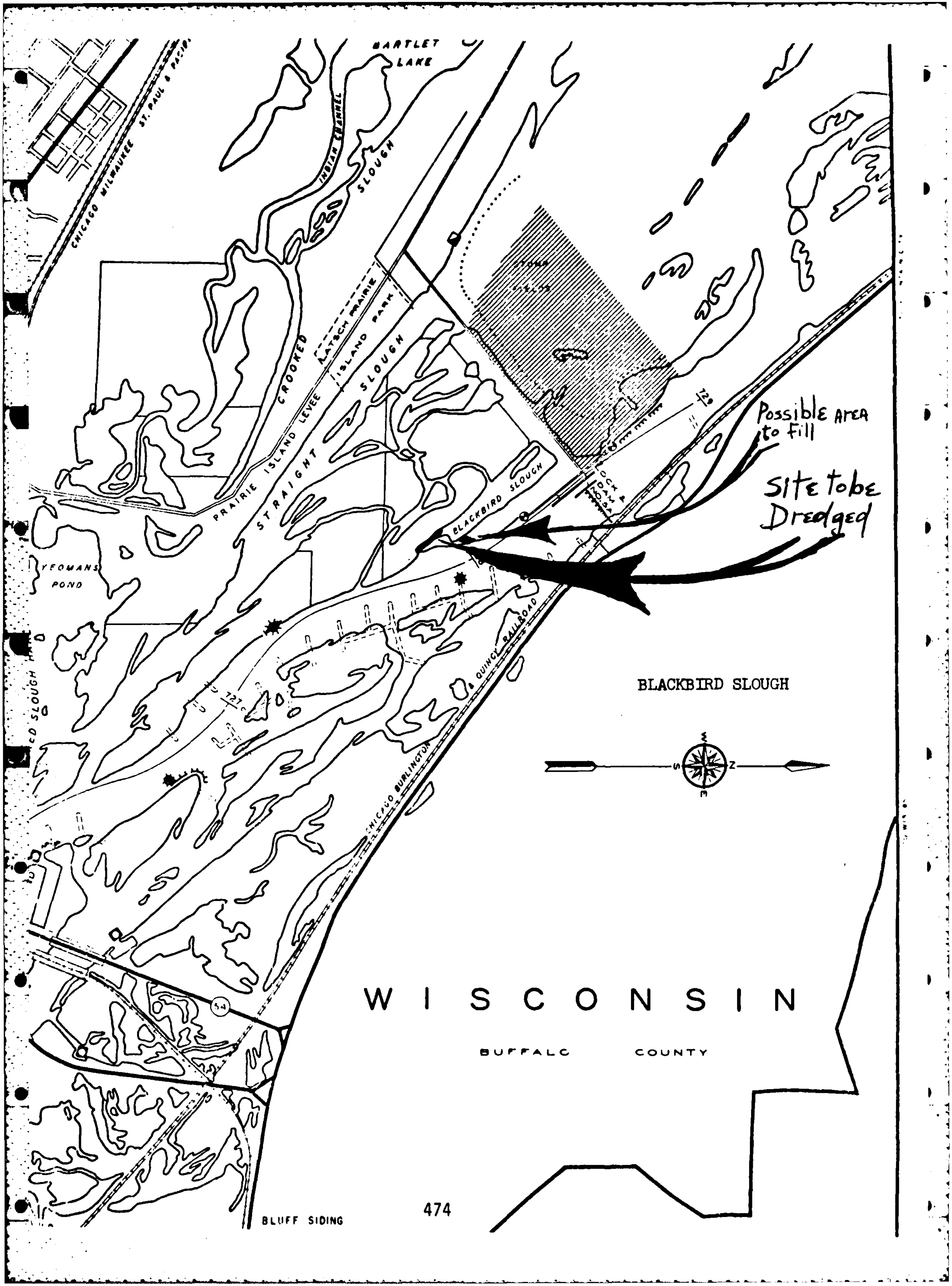


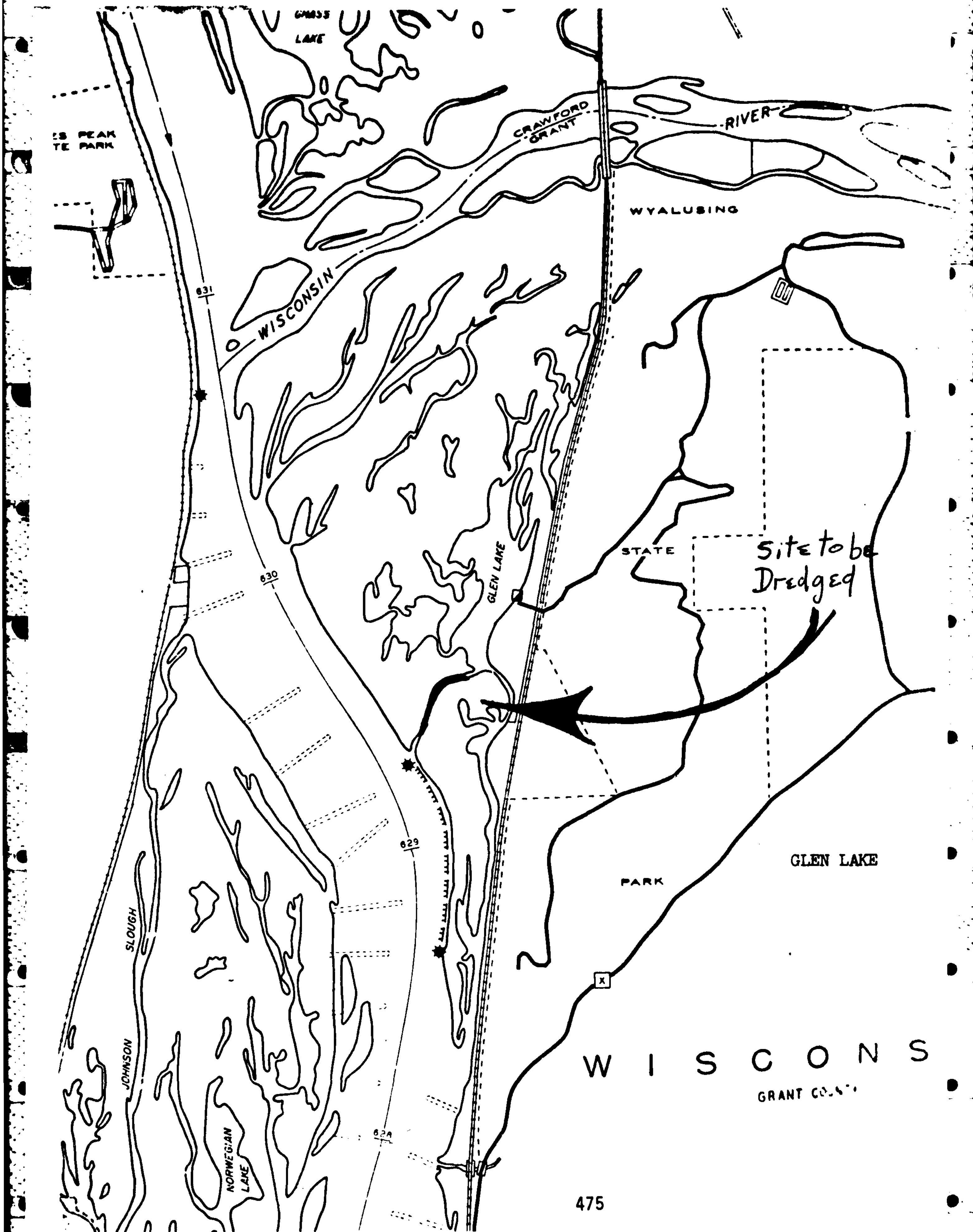
4th CUT INTO LOWER LAKE

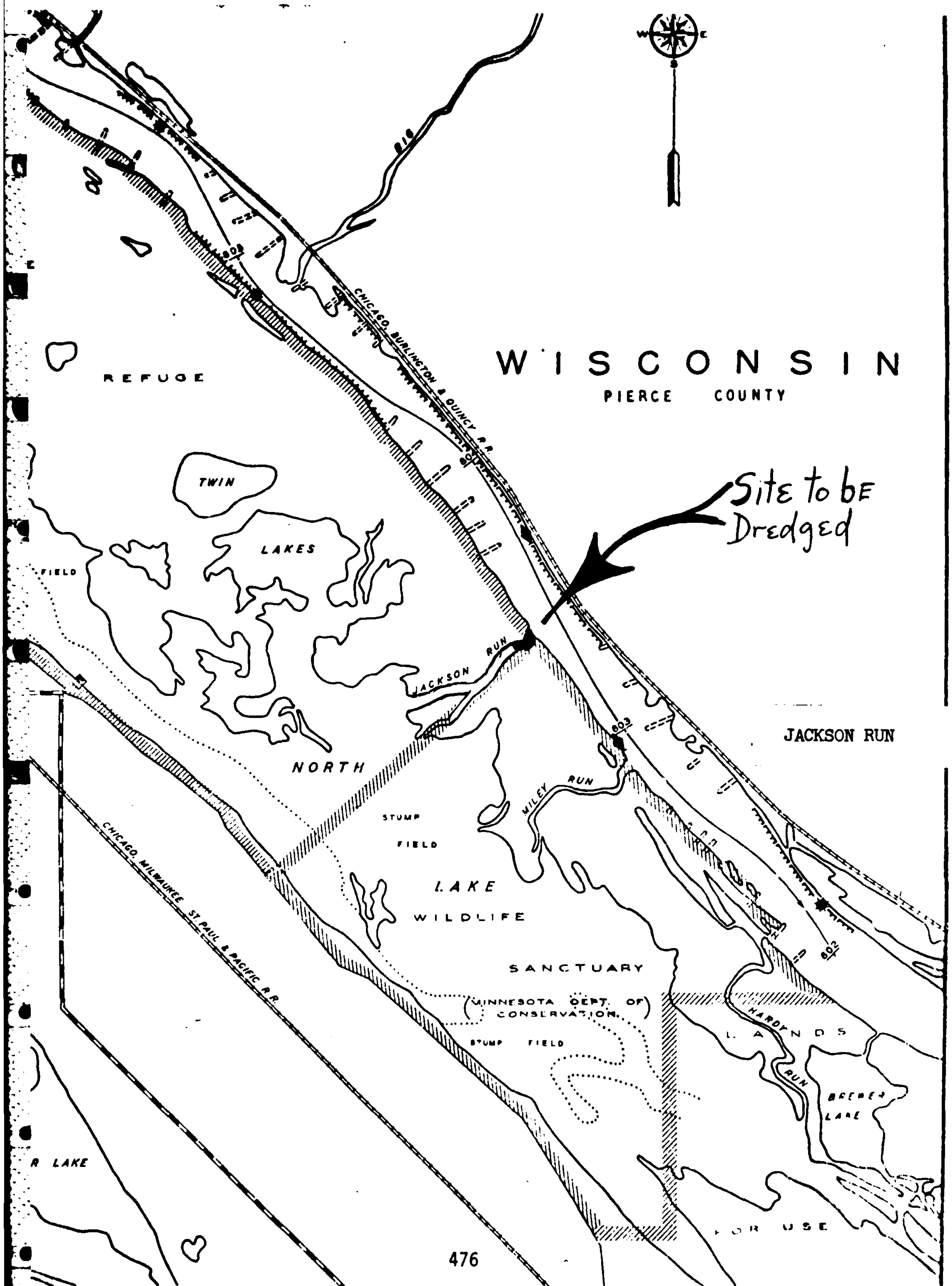
HARPER'S FERRY
CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC R.R.
HARPERS SLOUGH
DELPHY ISLAND
SLOUGH
McDONALD
ISLAND
647
646
645
644
35
Site to be Dredged
Dead Slough
(McDONALD SLOUGH)
CHICAGO BURLINGTON & QUINCY R.R.
WISCONSIN
CRAWFORD COUNTY



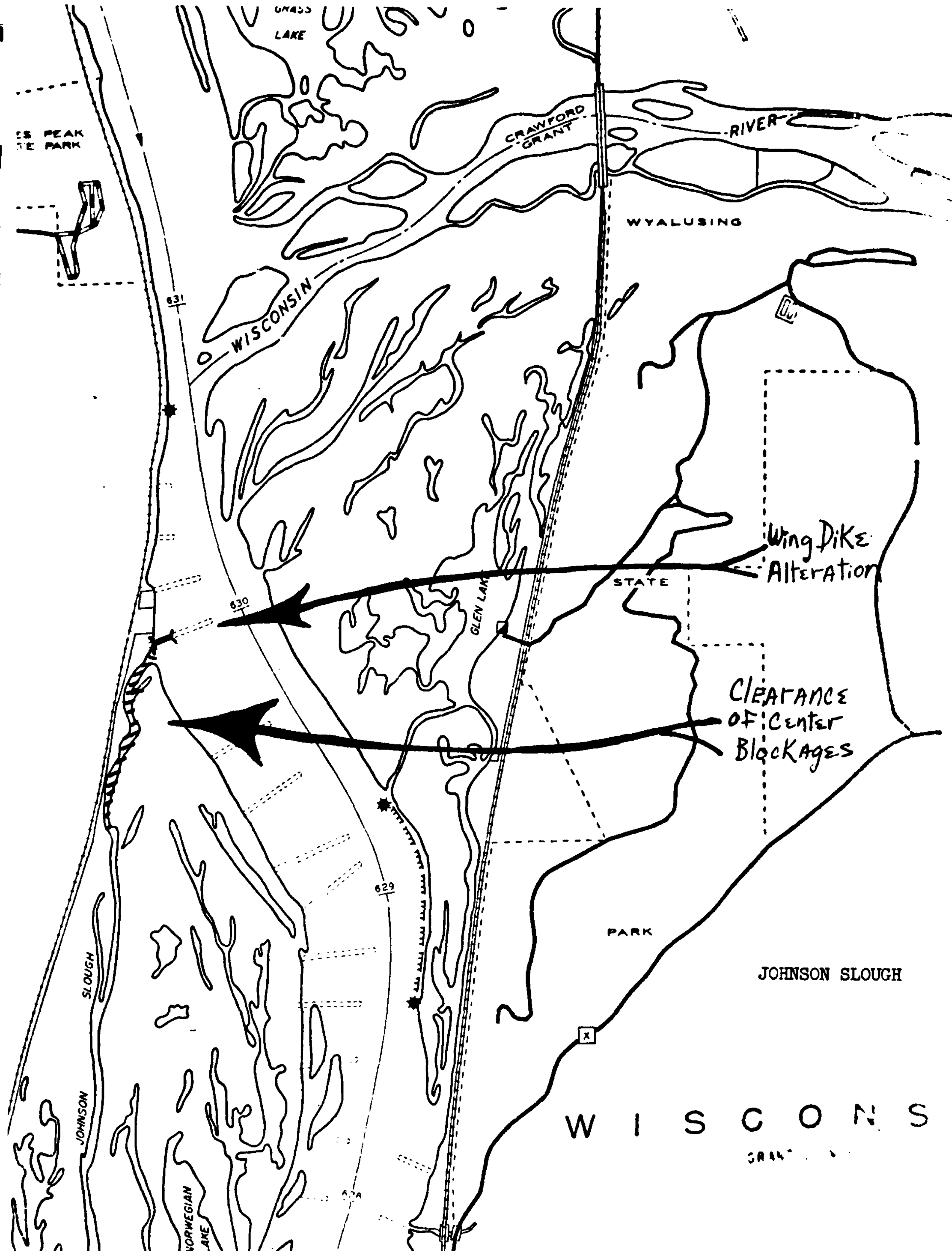
SHINGLE
BULLET CHUTE
BLACK
CHUTE
DODGE
BULLET CHUTE
TO WINONA
TO COUNTY ROAD 12
710
709
708
707
Site to be Dredged
14
61
16
CHICAGO MILWAUKEE ST PAUL & PACIFIC RR
MINNESOTA
WINONA COUNTY
DAKOTA
LEGEND
GOVERNMENT PROPERTY
WILDLIFE SANCTUARY*
WING DAM
LEVEE
BANK PROTECTION
AERIAL CABLE CROSSING
COMMERCIAL DOCK

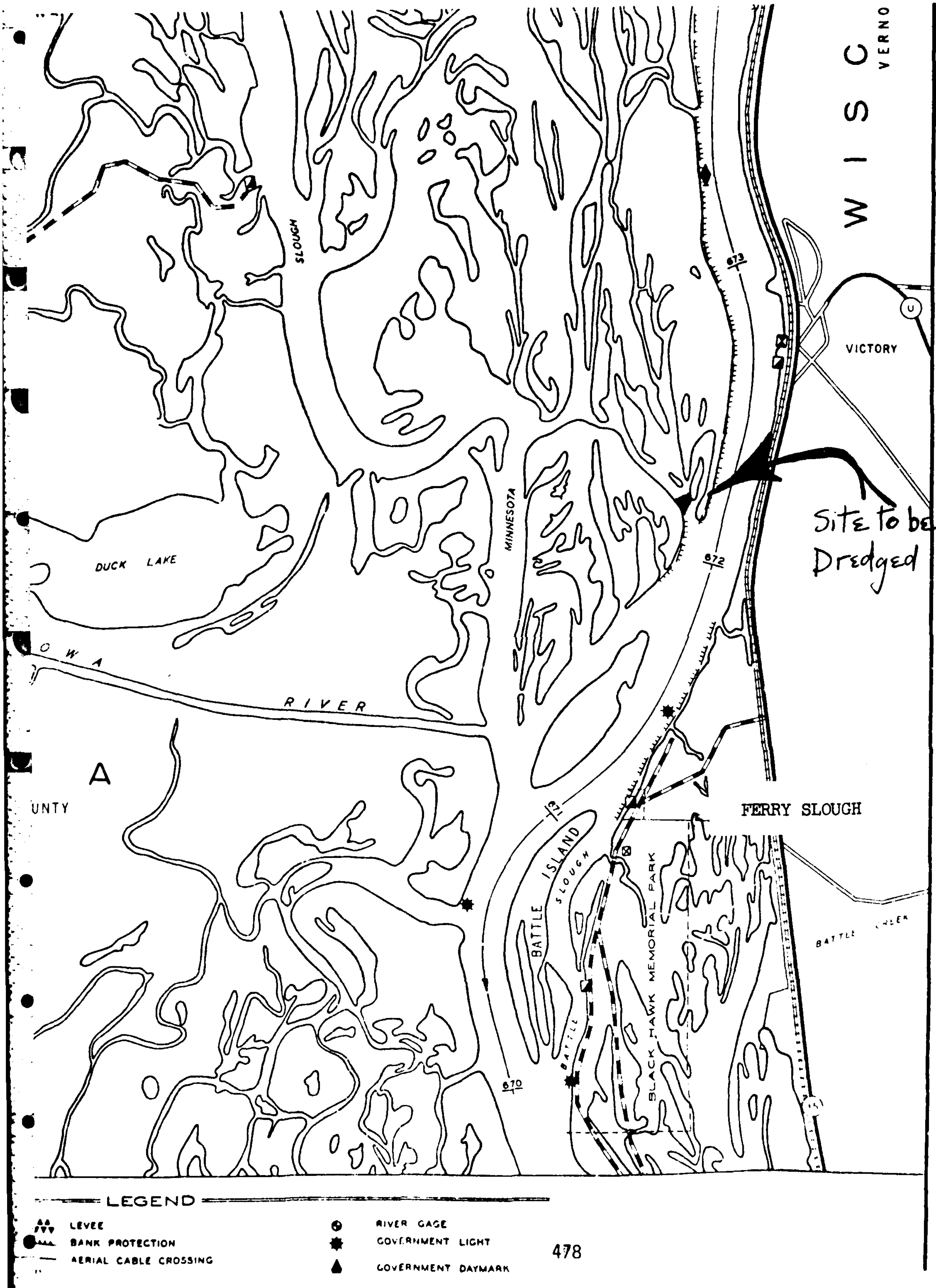

BARTLET LAKE
CHICAGO MILWAUKEE ST. PAUL & PACIFIC
INDIAN CHANNEL
SLOUGH
CROOKED
LATSCH PRAIRIE
ISLAND PARK
PRAIRIE ISLAND LEVEE
STRAIGHT SLOUGH
BLACKBIRD SLOUGH
YEOMANS POND
729
Possible area to Fill
Site to be Dredged
QUINCY RAILROAD
CHICAGO BURLINGTON
BLACKBIRD SLOUGH
WISCONSIN
BUFFALO COUNTY
BLUFF SIDING


GRASS LAKE
CRAWFORD
GRANT
RIVER
WYALUSING
WISCONSIN
631
630
629
628
GLEN LAKE
STATE
Site to be Dredged
PARK
GLEN LAKE
JOHNSON SLOUGH
NORWEGIAN LAKE
W I S C O N S
GRANT CO.



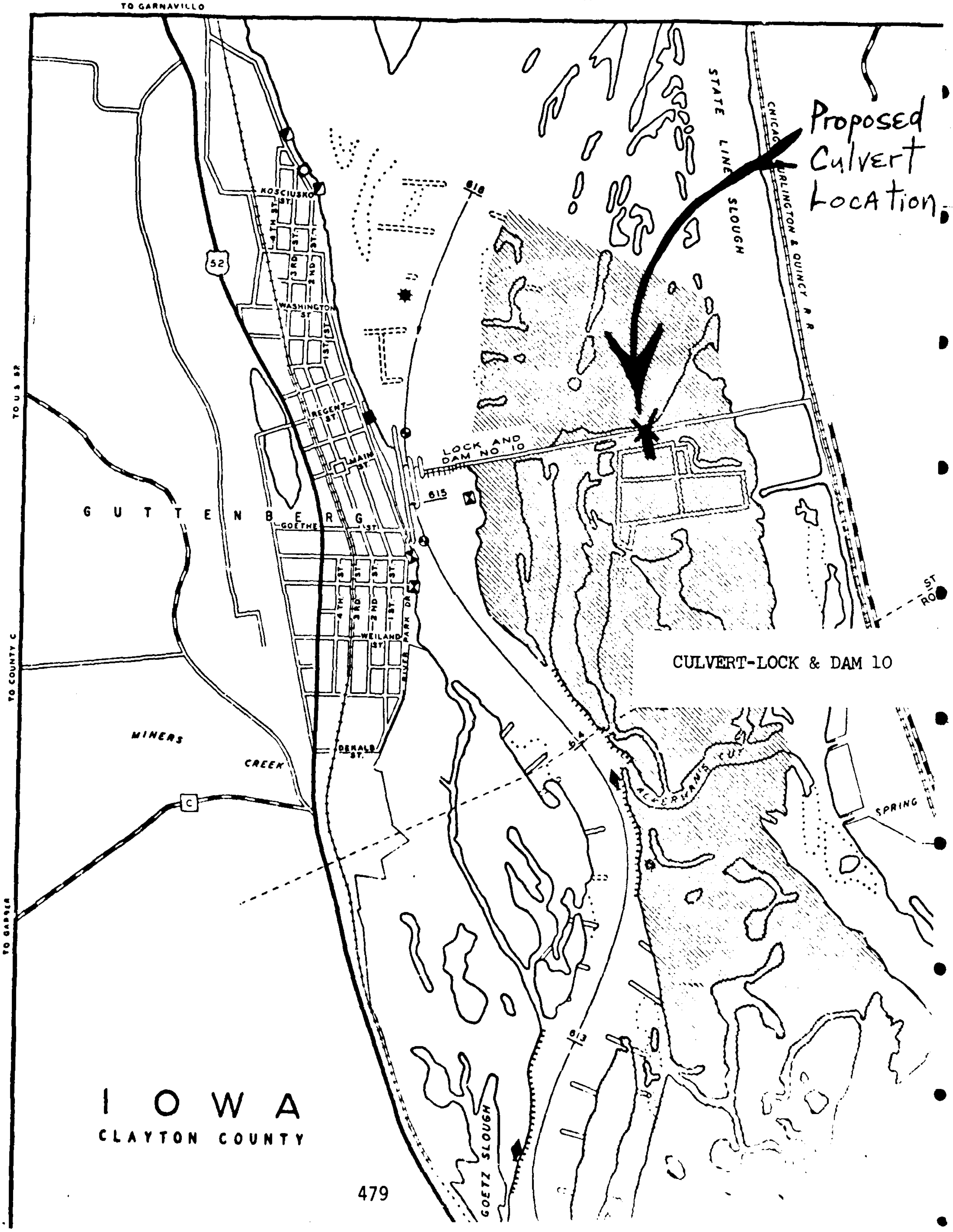
WISCONSIN
PIERCE COUNTY
CHICAGO, BURLINGTON & QUINCY R.R.
Site to be Dredged
JACKSON RUN
REFUGE
TWIN
LAKES
FIELD
JACKSON RUN
NORTH
STUMP
FIELD
MILEY RUN
LAKE
WILDLIFE
SANCTUARY
(MINNESOTA DEPT. OF CONSERVATION)
STUMP FIELD
HARDY'S RUN
R LAKE
CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC R.R.
FOR USE


GRASS LAKE
CRAWFORD
GRANT
RIVER
WISCONSIN
WYALUSING
631
630
629
GLEN LAKE
STATE
PARK
JOHNSON SLOUGH
WISCONS
SLOUGH
JOHNSON
NORWEGIAN LAKE
Wing Dike Alteration
Clearance of Center Blockages



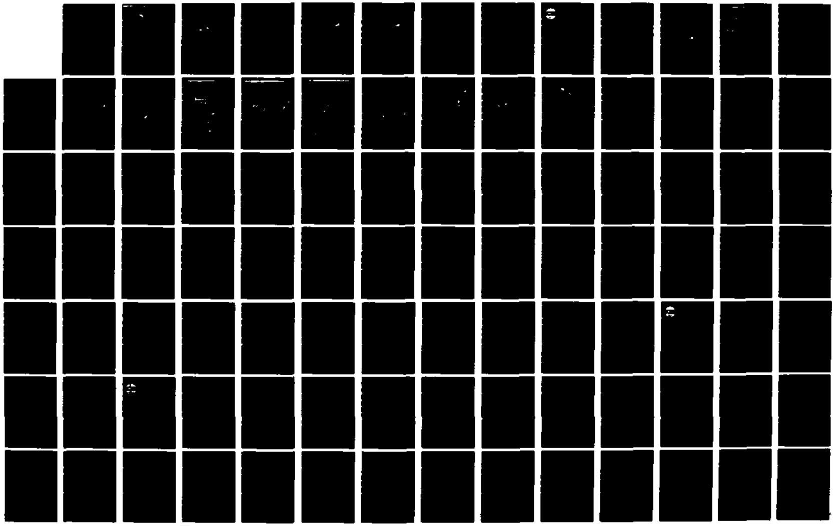
W I S C
VERNO
SLOUGH
DUCK LAKE
MINNESOTA
O W A
RIVER
A
UNTY
673
672
670
VICTORY
TO RED MOUND WIS
Site to be Dredged
FERRY SLOUGH
BATTLE ISLAND
SLOUGH
BATTLE
BLACK HAWK MEMORIAL PARK
LEGEND
LEVEE
BANK PROTECTION
AERIAL CABLE CROSSING
RIVER GAGE
GOVERNMENT LIGHT
GOVERNMENT DAYMARK

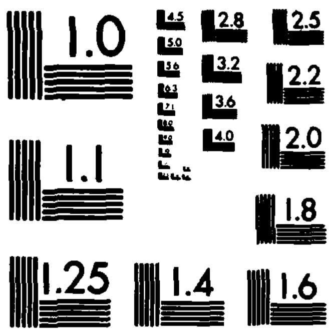
CORPS OF ENGINEERS



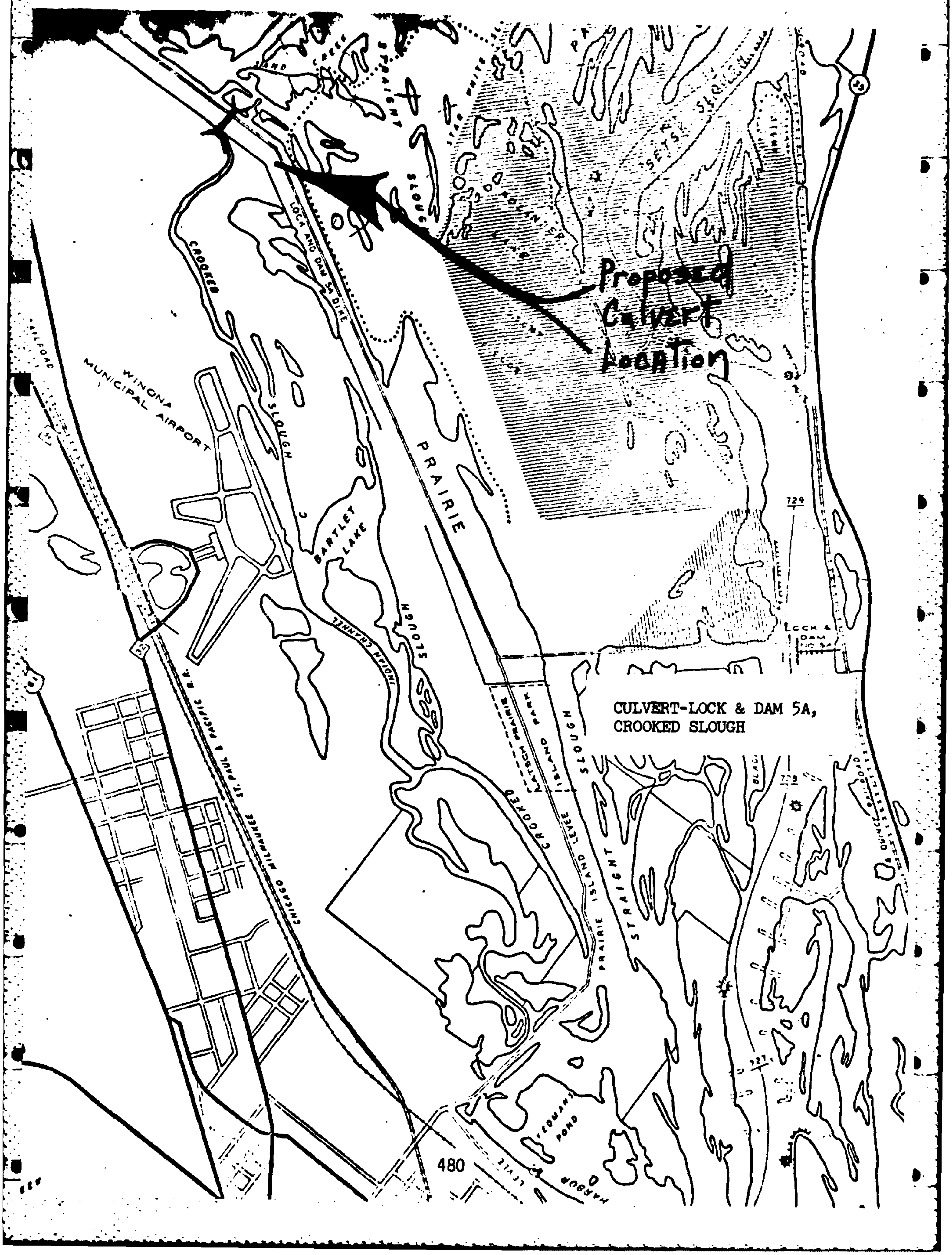
AD-A127 212 GREAT I STUDY OF THE UPPER MISSISSIPPI RIVER TECHNICAL APPENDIXES VOLUME 5 FISH AND WILDLIFE PART II(U) GREAT RIVER ENVIRONMENTAL ACTION TEAM M J VANDERFORD SEP 80 3/5

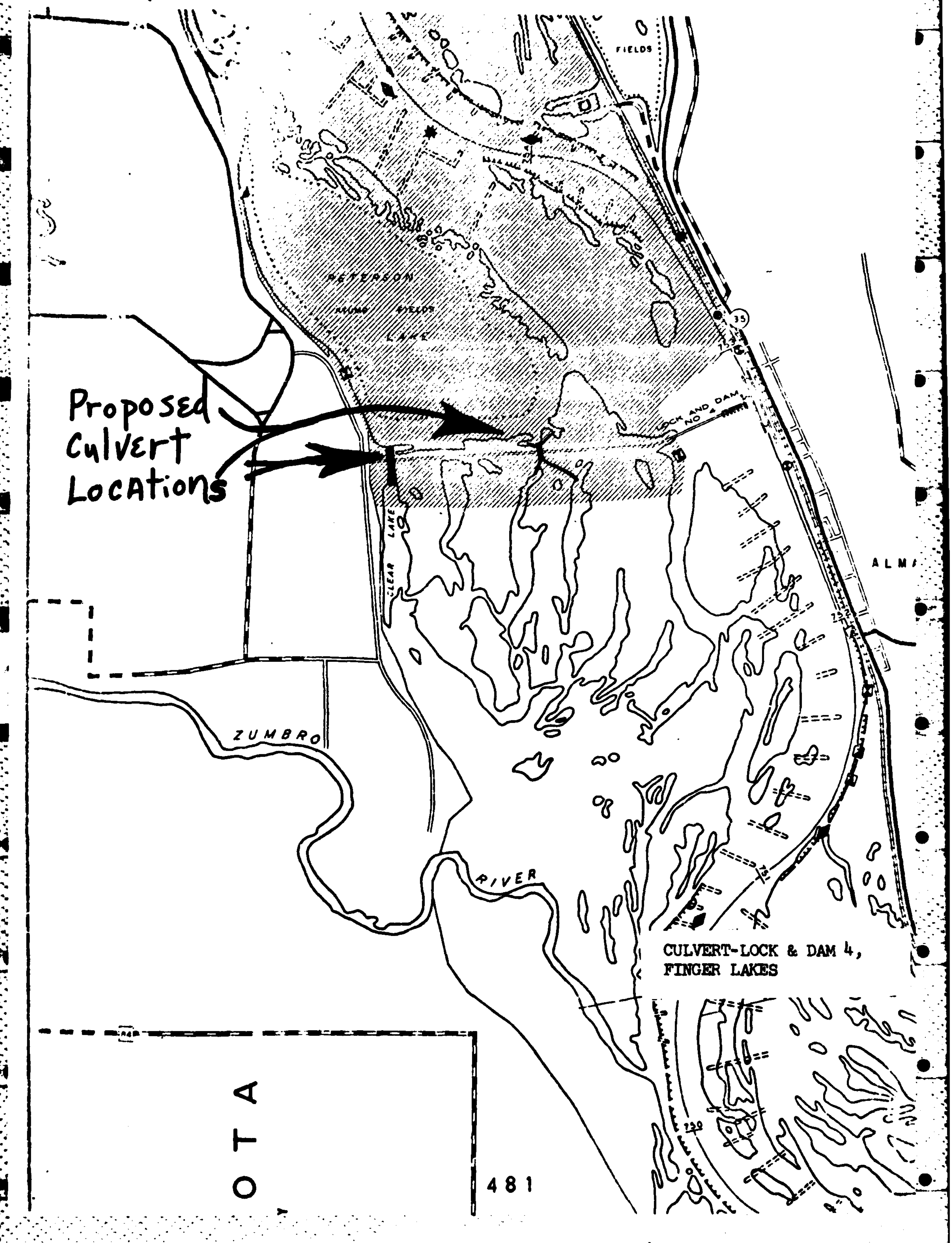
UNCLASSIFIED F/G 13/2 NL

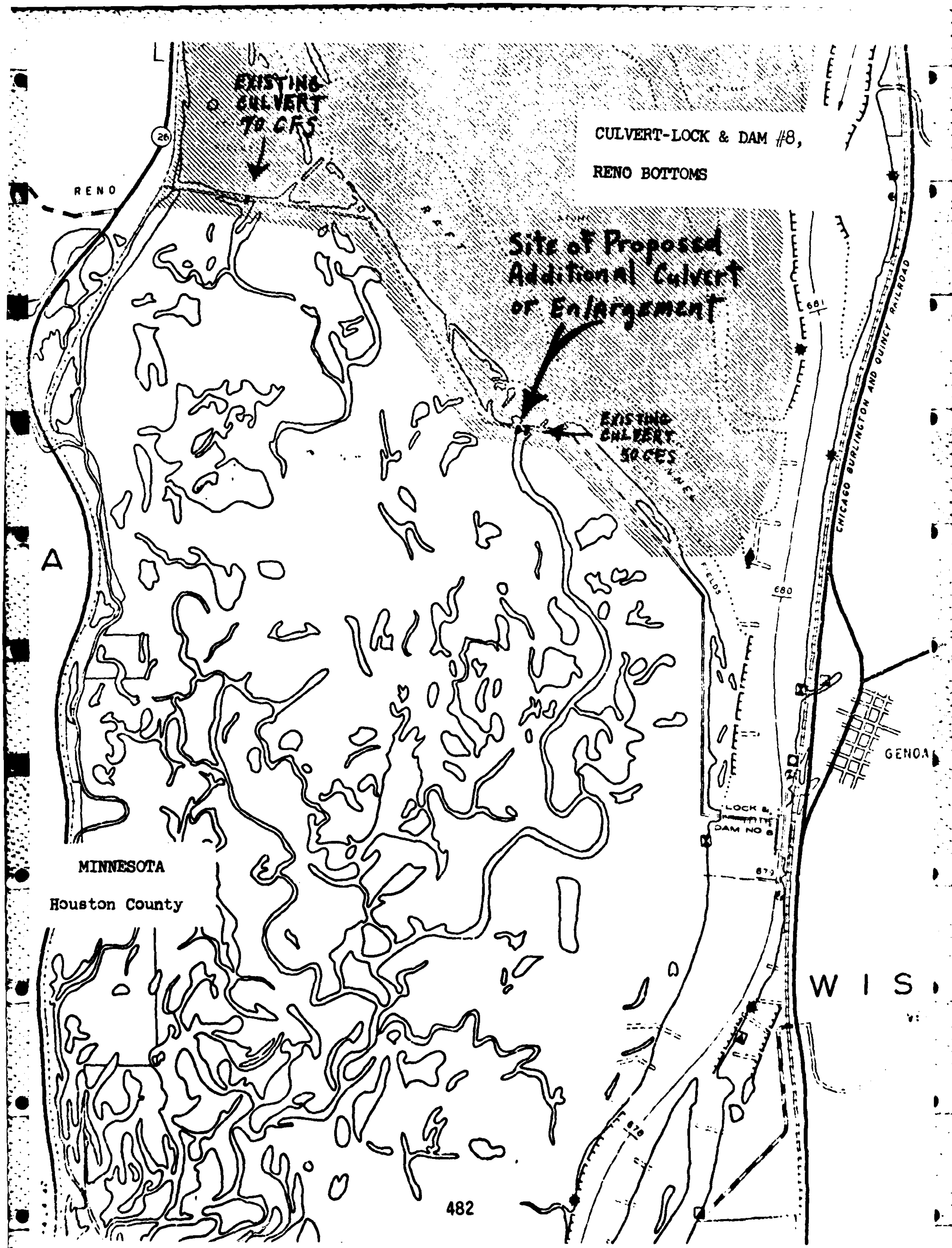


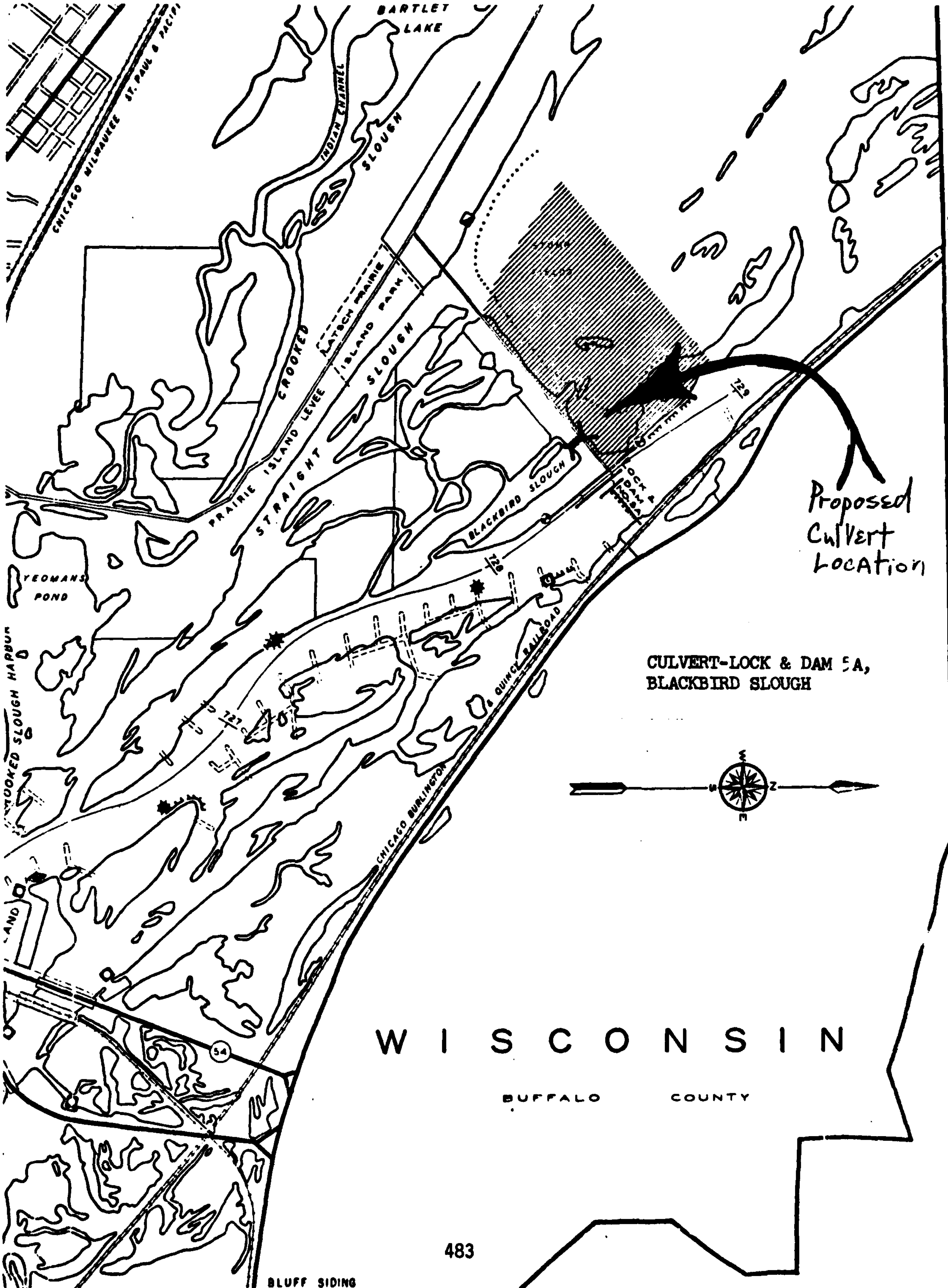


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

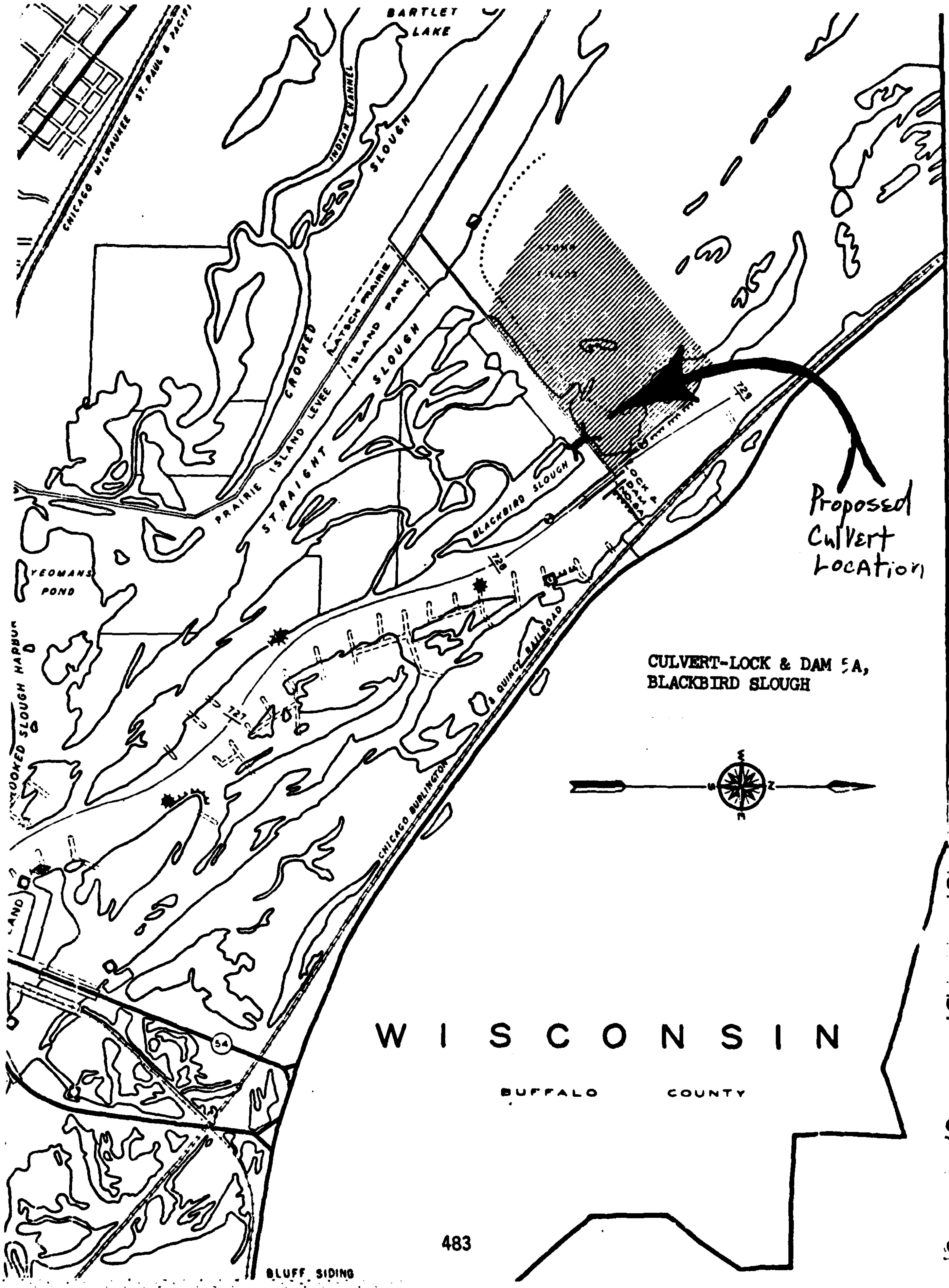

Proposed Culvert Location
CROOKED SLOUGH
LOCK AND DAM 5A DIKE
WINONA MUNICIPAL AIRPORT
SLOUGH
BARTLET LAKE
PRAIRIE
INDIAN CHANNEL
SLOUGH
CHICAGO MILWAUKEE ST. PAUL & PACIFIC R.R.
LATSCH PRAIRIE ISLAND PARK
CROOKED SLOUGH
PRAIRIE ISLAND LEVEE
STRAIGHT SLOUGH
YEOMANS POND
HARBOR LEVEE
LOCK & DAM 5A
729
727
480
CULVERT-LOCK & DAM 5A, CROOKED SLOUGH


Proposed Culvert Locations
FIELDS
PETERSON
LAKE
LOCK AND DAM NO 4
35
CLEAR LAKE
ALM
ZUMBRO
RIVER
O T A
481
CULVERT-LOCK & DAM 4,
FINGER LAKES


CULVERT-LOCK & DAM #8,
RENO BOTTOMS
EXISTING CULVERT 70 CFS
Site of Proposed Additional Culvert or Enlargement
EXISTING CULVERT 50 CFS
RENO
26
A
MINNESOTA
Houston County
CHICAGO BURLINGTON AND QUINCY RAILROAD
GENOA
LOCK & DAM NO 8
WIS
681
680
679
678
FIELDS



CULVERT-LOCK & DAM 5A, BLACKBIRD SLOUGH



CULVERT-LOCK & DAM 5A, BLACKBIRD SLOUGH

APPENDIX J

SIDE CHANNEL OPENING PROJECTS RECOMMENDED

FOR ACCOMPLISHMENT BY THE CORPS OF

ENGINEERS (1977)

APPENDIX J

SIDE CHANNEL OPENING PROJECTS RECOMMENDED FOR ACCOMPLISHMENT BY THE CORPS OF ENGINEERS (1977)

GREAT
Great River Environmental Action Team
FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725 4690

GREAT

July 8, 1977

TO: Chairman, Dredging Requirements Work Group

FROM: Chairman, Side Channel Work Group

SUBJECT: Side Channel Alterations Recommended to be Accomplished using Corps Operations and Maintenance Funds

Listed on the attached sheet are eight side channel openings and five culvert placements which the Side Channel Work Group has recommended for accomplishment by the St. Paul Corps District using operations and maintenance funds. These projects are listed according to the SCWG's priority and should be accomplished in order if possible. The priority listings for side channel openings and for culverts are seperate. We request that these two destinct project catagories be pursued simultaneously.

Attached also are thirteen maps indicating the approximate location of each project for which we have requested consideration. Your cooperation in this matter is sincerely appreciated.

Michael J. Vanderford

Michael J. Vanderford
Chairman, Side Channel Work Group

Great River Environmental Action Team

Side Channel Work Group

July 8, 1977

Recommendations for Side Channel Openings &
Culvert Placements to be Accomplished with O & M Funds

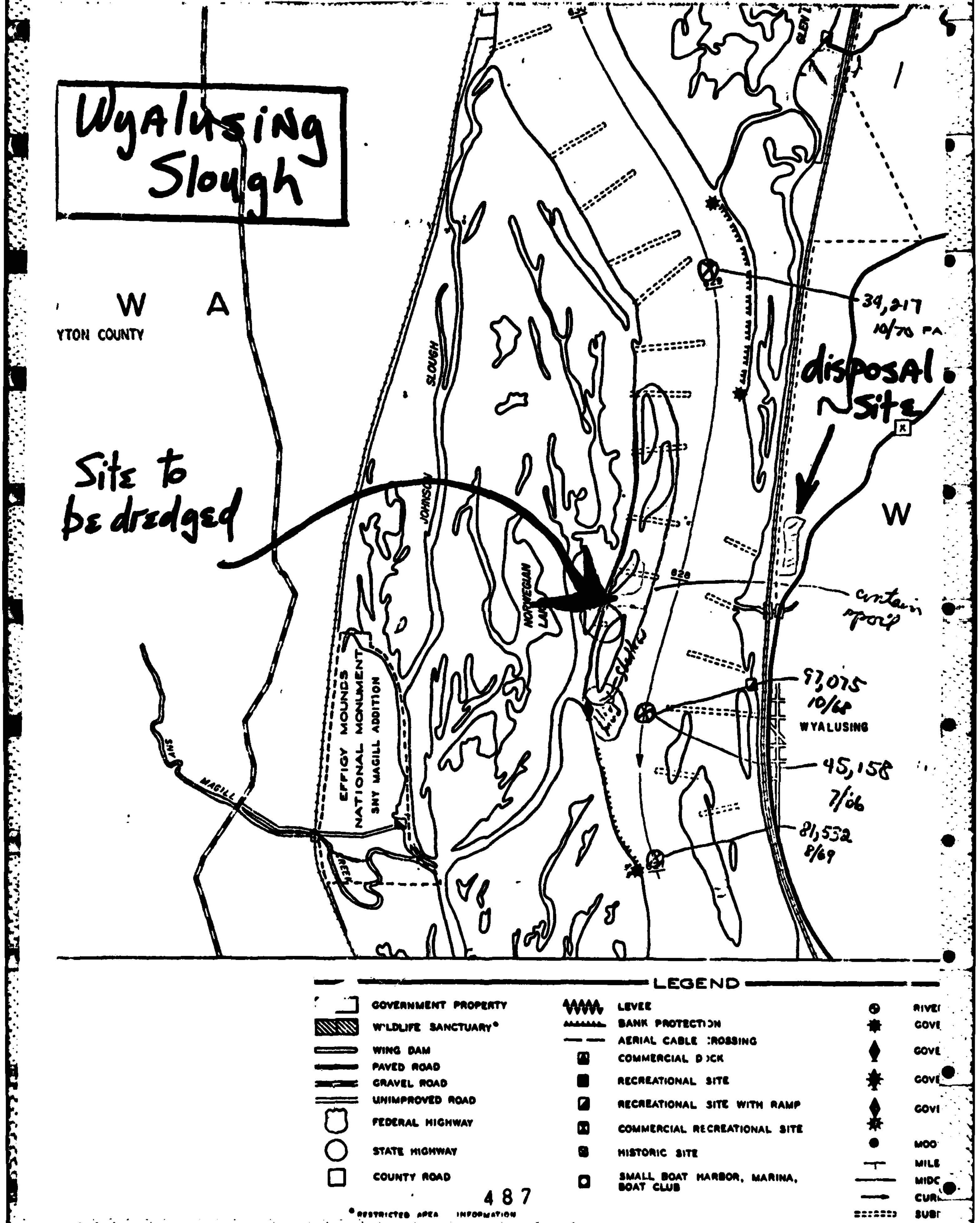
Side Channel Openings

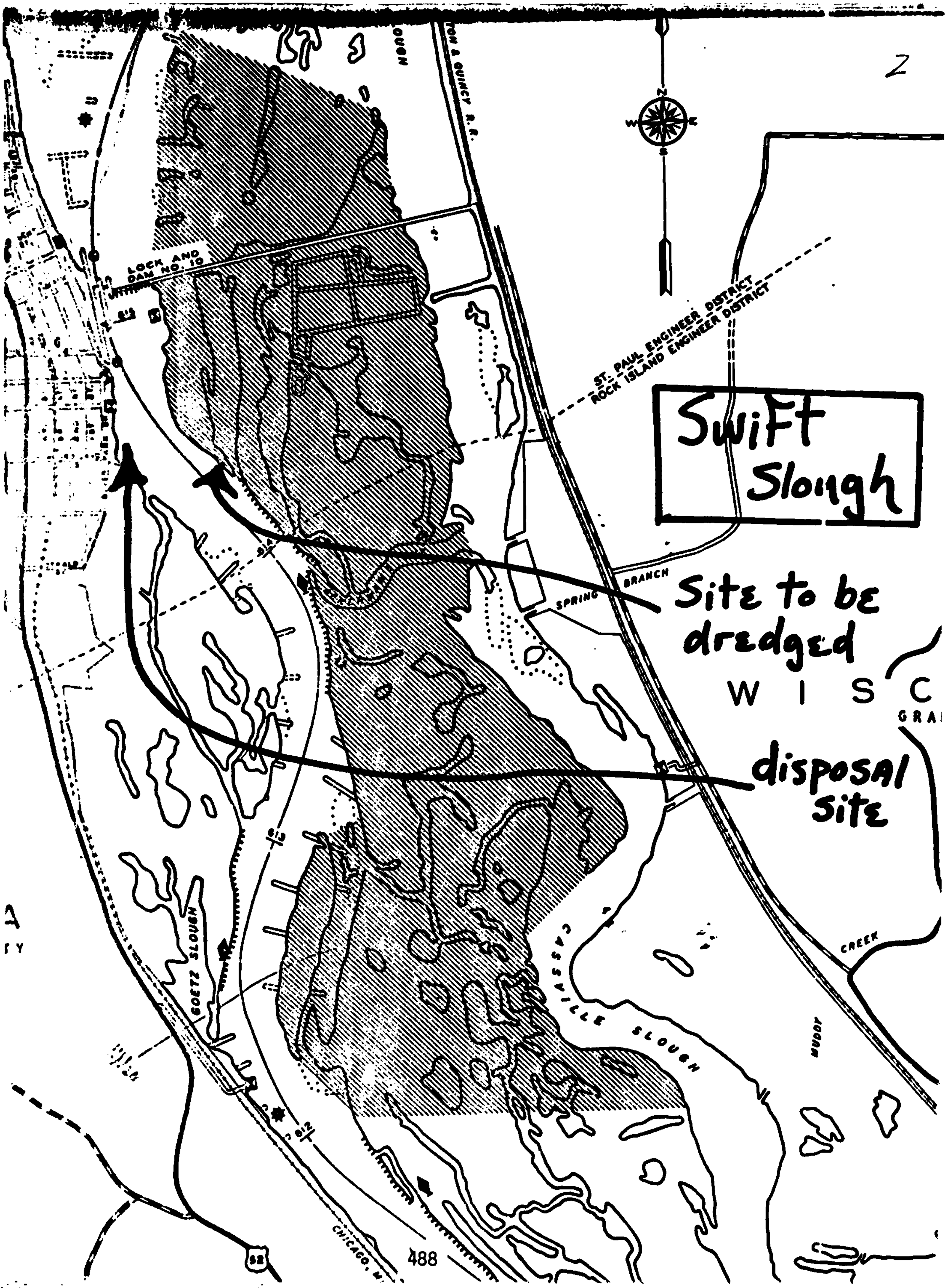
1. Wyalusing Slough (Wyalusing, Wisconsin) - RM 627.9
2. Swift Slough (Guttenberg, Iowa) - RM 614.3
3. Dead ~~McDonald~~ Slough (Victory, Wisconsin) - RM 646.5
4. Ferry Slough (Victory, Wisconsin) - RM 672.1
5. Bullet Chute (Black River, Wisconsin) - RM 708.7
6. Hummingbird Slough (Lansing, Iowa) -
7. Blackhawk Park Slough (DeSoto, Wisconsin) RM - 671.6
8. Indian Creek (Fountain City, Wisconsin) - RM 737

Culvert Placements

1. Lock and Dam 5 - Fountain City Bay
2. Lock and Dam 10 - Waterfowl Production Area
3. Lock and Dam 4 - Finger Lakes
4. Lock and Dam 5A - Crooked Slough
5. Lock and Dam 8 - Reno Bottoms

* see attached map depictions


Wyalusing Slough
W A
YTON COUNTY
Site to be dredged
SLOUGH
JOHNSON
NORWEGIAN LAKE
EFFIGY MOUNDS NATIONAL MONUMENT SNY MAGILL ADDITION
MAGILL
disposal site
39,217
10/70 PA
828
contain spoil
97,075
10/68
WYALUSING
45,158
7/66
81,532
8/69
W
LEGEND
GOVERNMENT PROPERTY
WILDLIFE SANCTUARY*
WING DAM
PAVED ROAD
GRAVEL ROAD
UNIMPROVED ROAD
FEDERAL HIGHWAY
STATE HIGHWAY
COUNTY ROAD
LEVEE
BANK PROTECTION
AERIAL CABLE CROSSING
COMMERCIAL DOCK
RECREATIONAL SITE
RECREATIONAL SITE WITH RAMP
COMMERCIAL RECREATIONAL SITE
HISTORIC SITE
SMALL BOAT HARBOR, MARINA, BOAT CLUB
*RESTRICTED AREA INFORMATION


2
Swift Slough
Site to be dredged
disposal site
LOCK AND DAM NO. 10
ST. PAUL ENGINEER DISTRICT
ROCK ISLAND ENGINEER DISTRICT
SPRING BRANCH
W I S C
GRA
CREEK
CASSVILLE SLOUGH
GOETZ SLOUGH
MUDDY
CHICAGO
TON & QUINCY R.R.
52

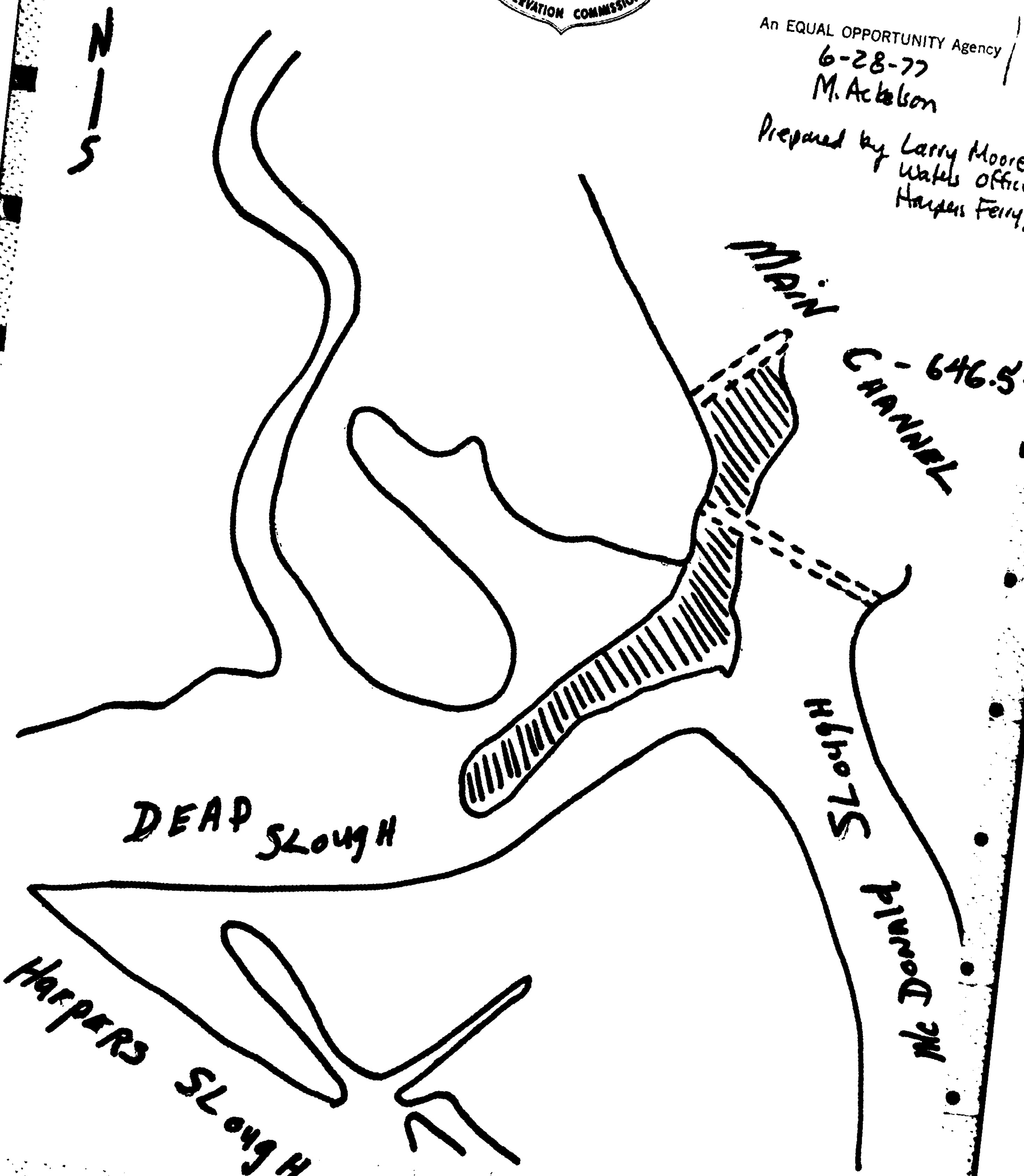
IOWA CONSERVATION COMMISSION

FRED A. PRIEWERT, Director
300 Fourth Street, Des Moines, Iowa 50319
515/281-5145

An EQUAL OPPORTUNITY Agency

6-28-77
M. Ackelson

Prepared by Larry Moore
Waters Officer
Harpers Ferry, I



Prepared by Larry Moore
Waters Office,
Harpers Ferry, Ia.

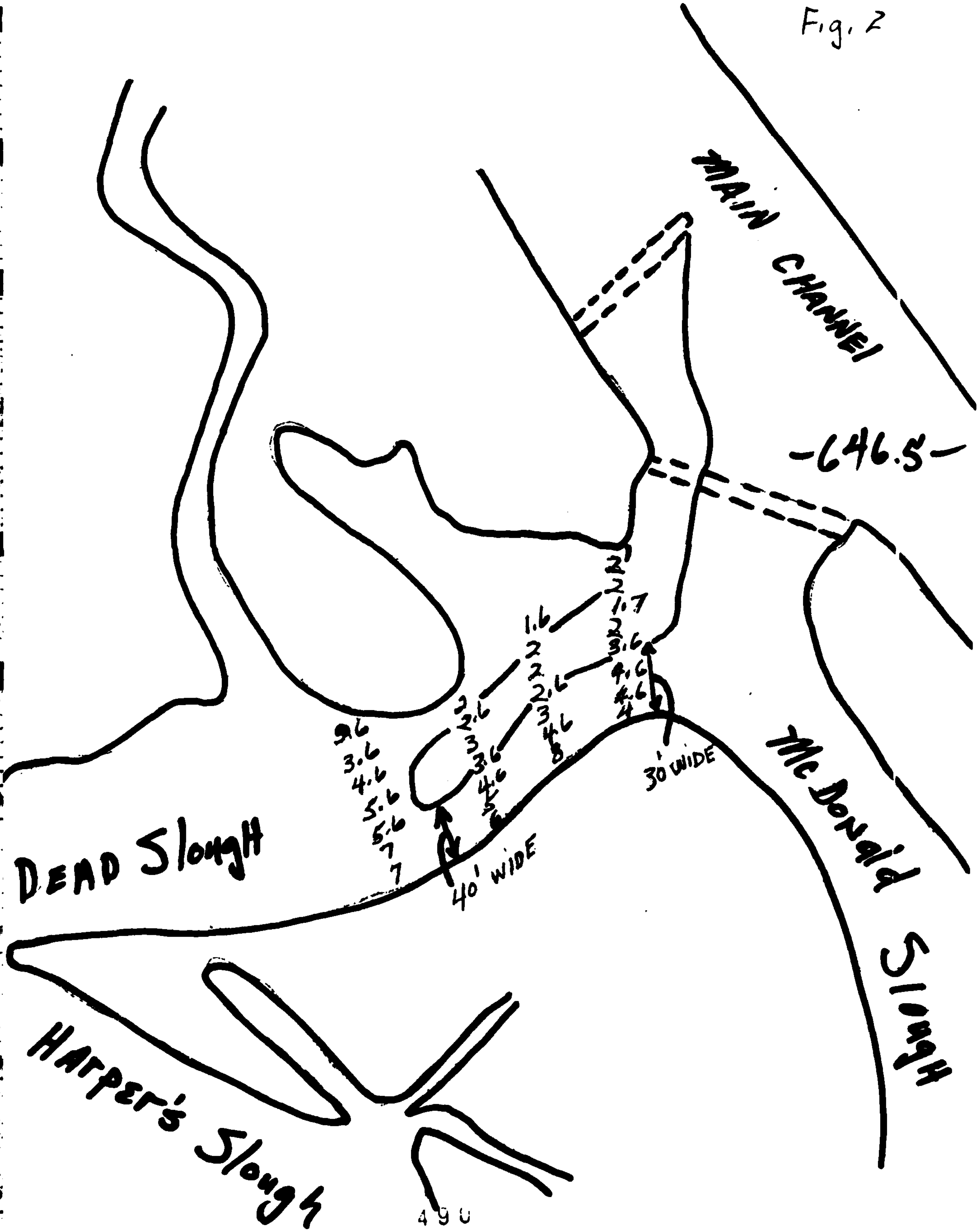
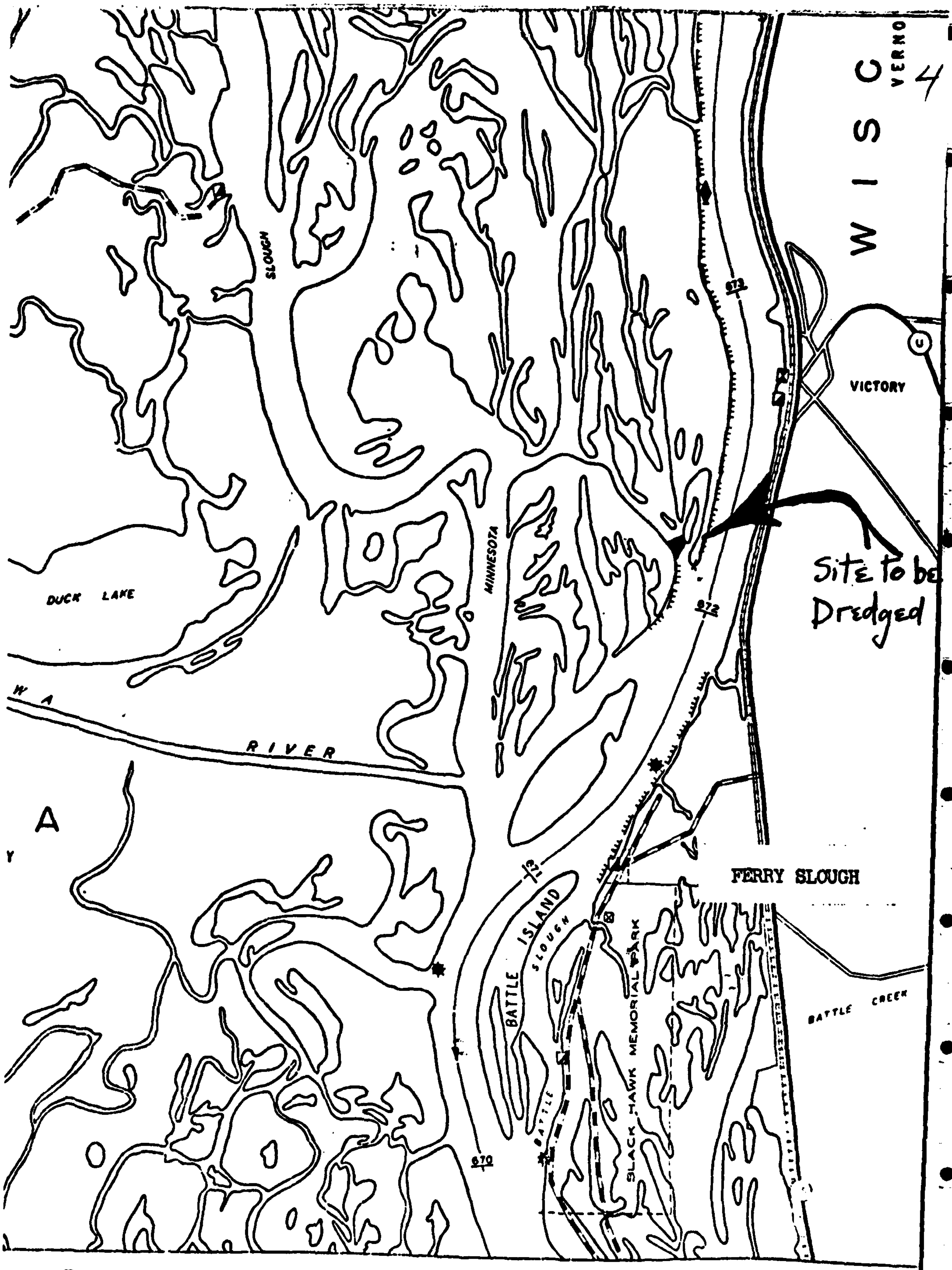
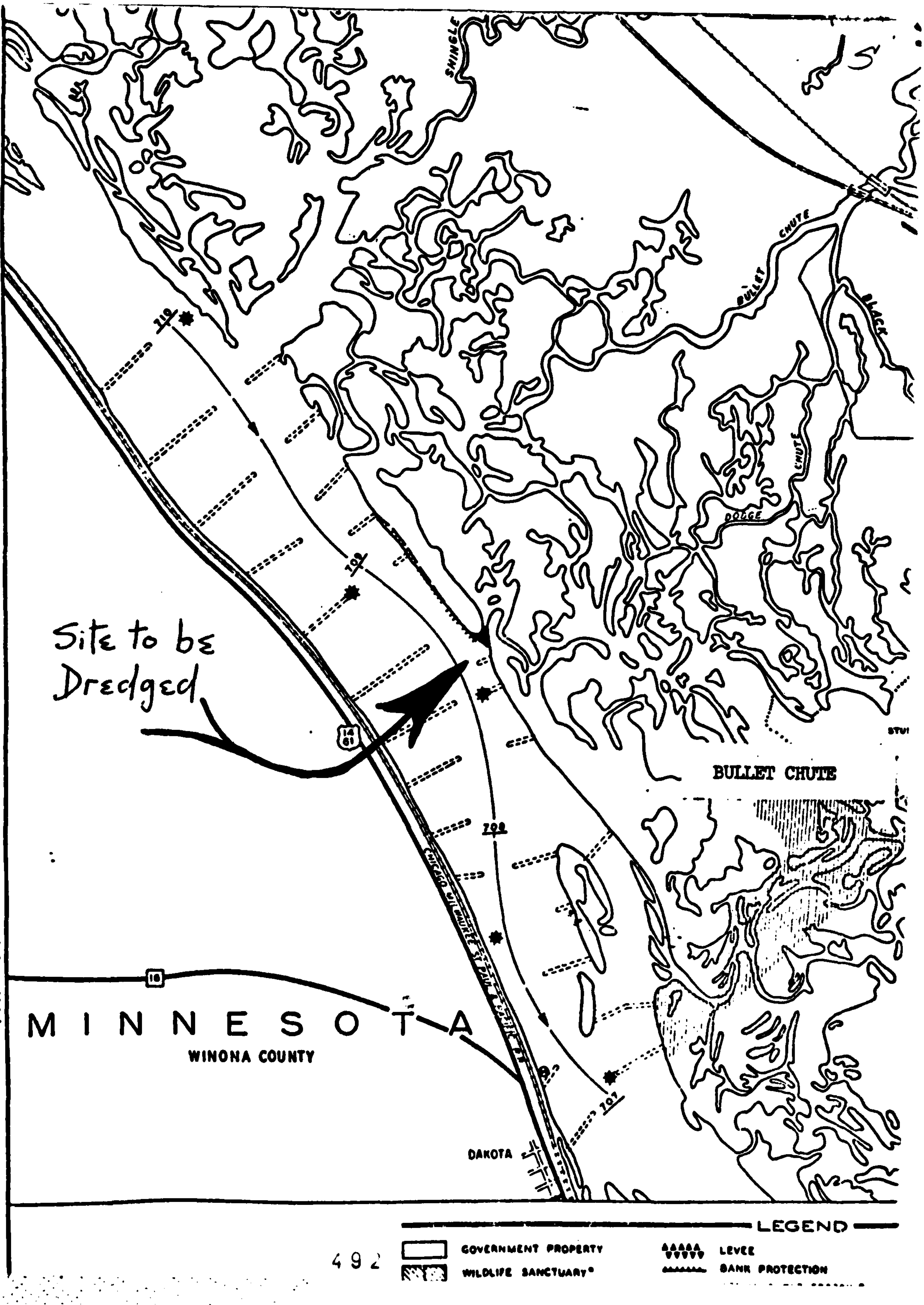


Fig. 2



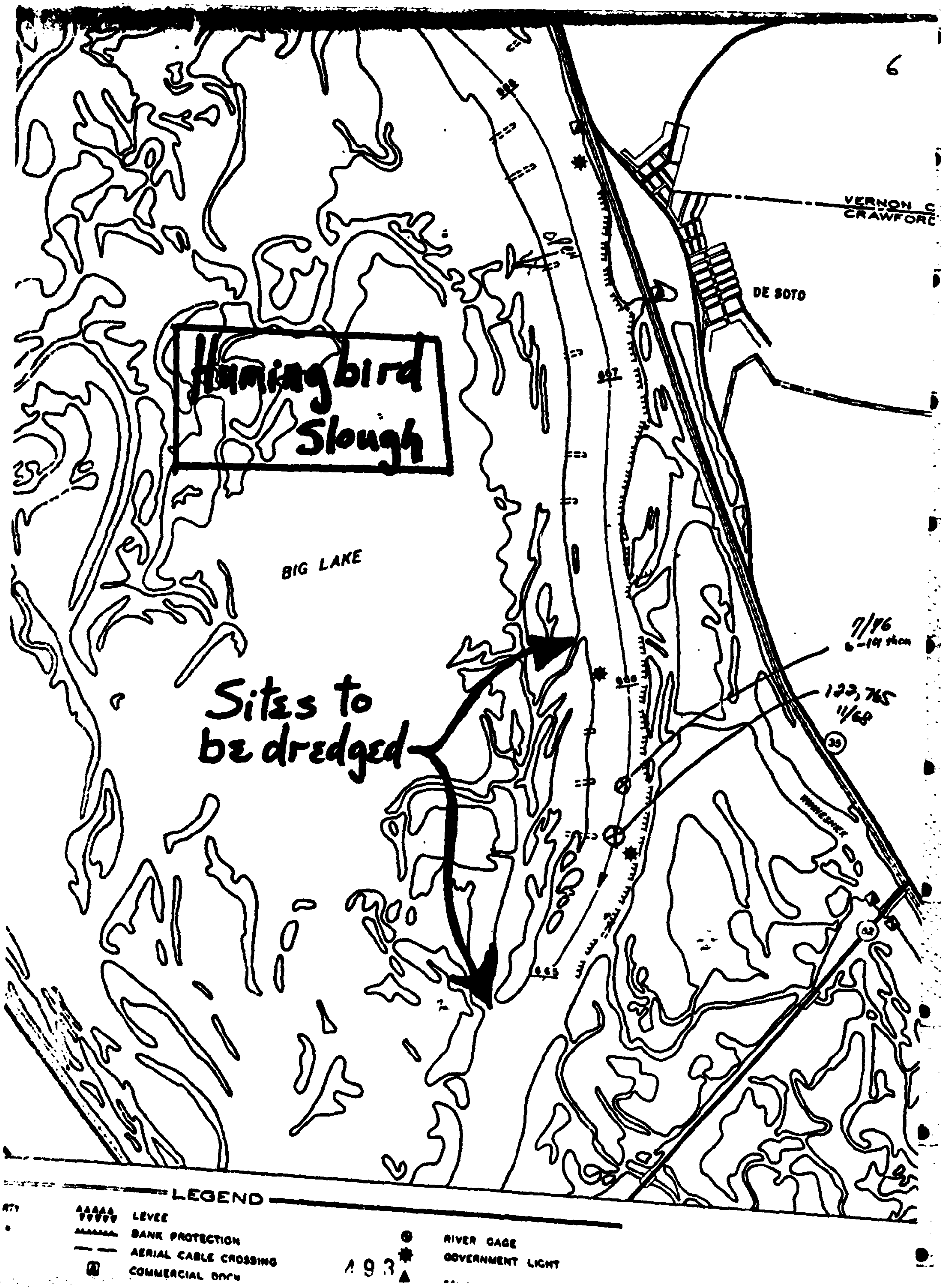
LEGEND

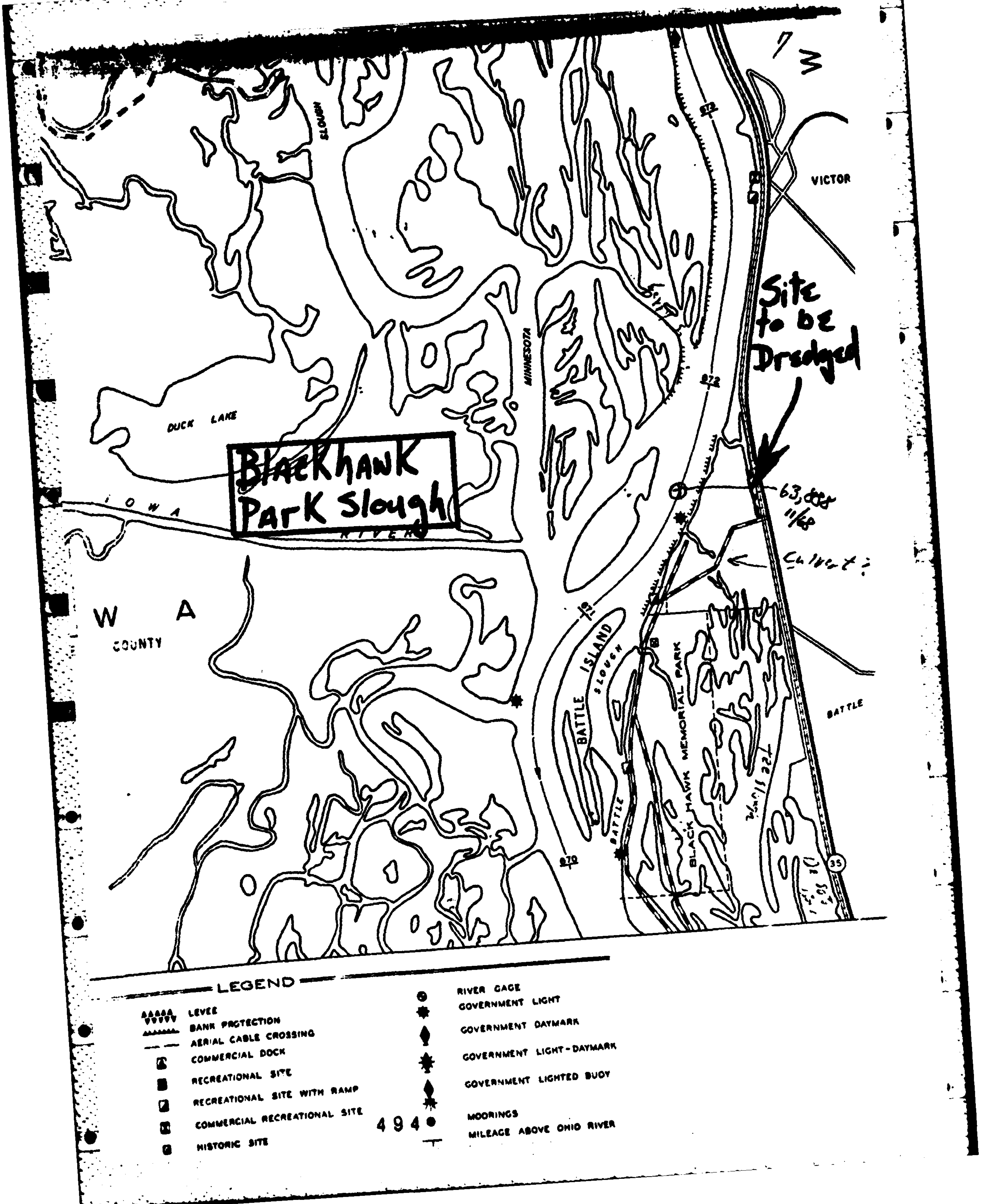
LEVEE
BANK PROTECTION
RIVER GAGE
GOVERNMENT LIGHT



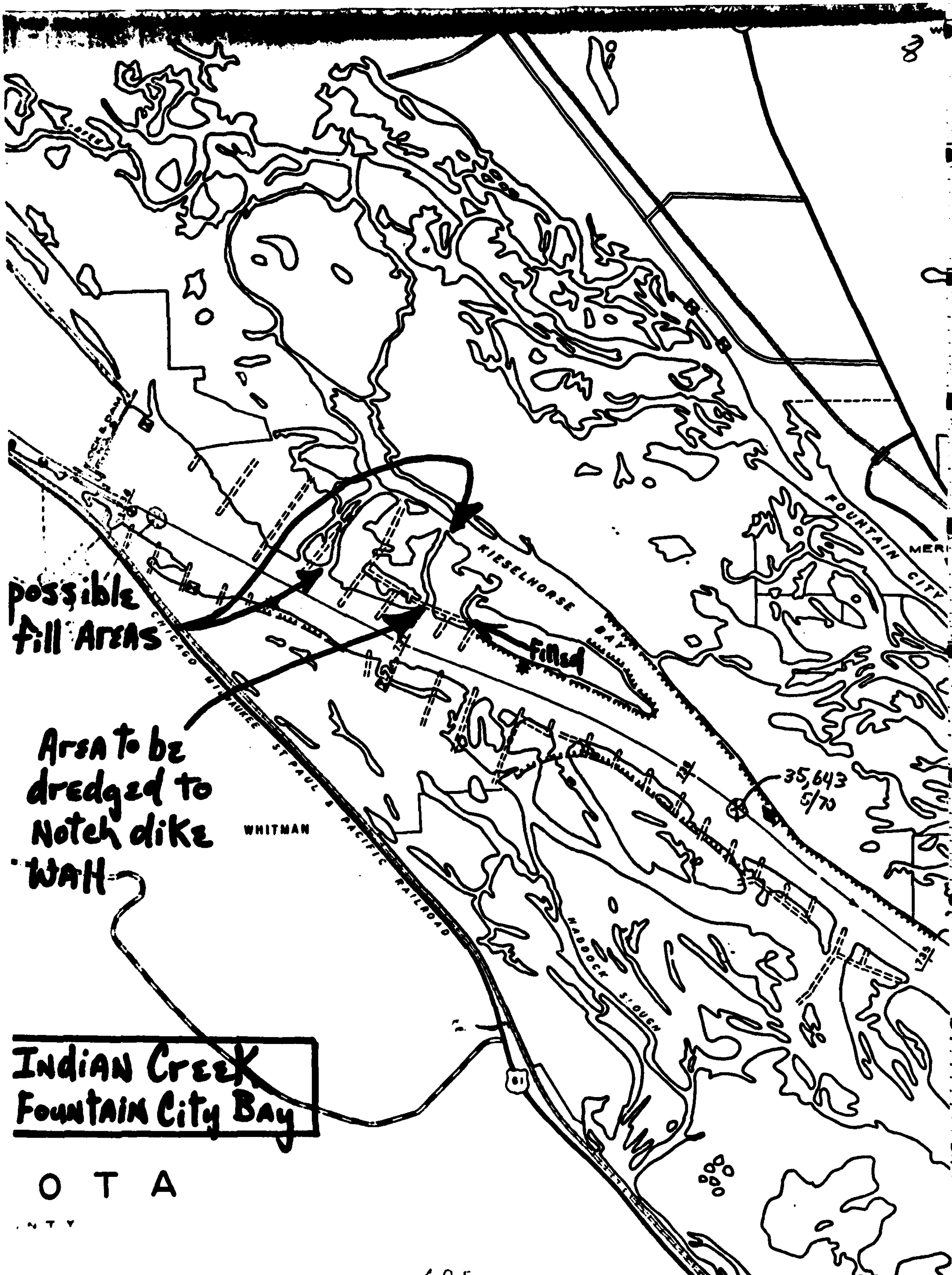
Site to be Dredged
SHINGLE
BULLET CHUTE
BLACK
DODGE
CHUTE
BULLET CHUTE
710
709
708
707
14
61
16
MINNESOTA
WINONA COUNTY
DAKOTA
CHICAGO MILWAUKEE ST PAUL & PACIFIC RR
LEGEND
GOVERNMENT PROPERTY
WILDLIFE SANCTUARY*
LEVEE
BANK PROTECTION

6

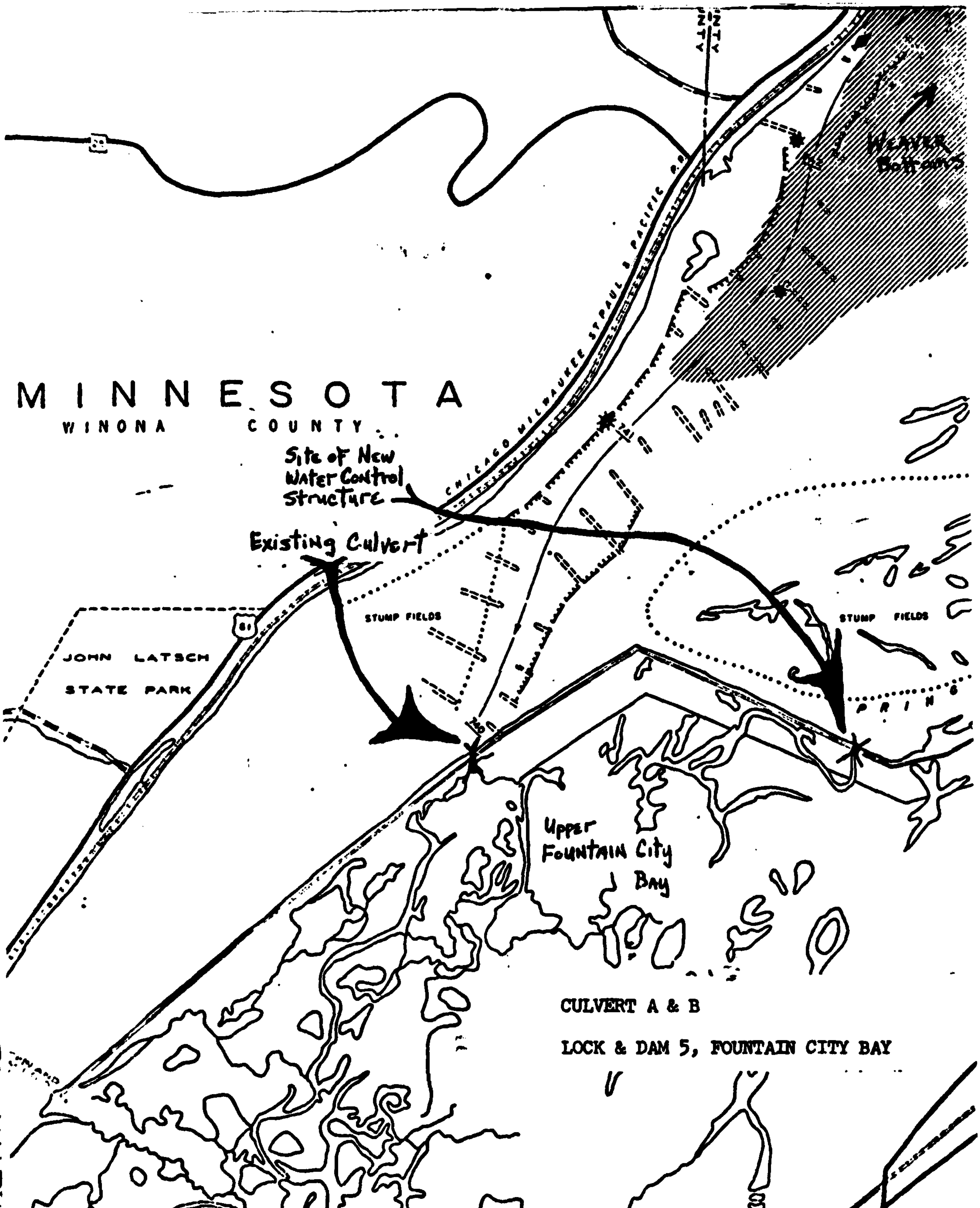

VERNON C
CRAWFORD
DE SOTO
Humingbird Slough
BIG LAKE
Sites to be dredged
7/76
123,765
11/68
35
LEGEND
LEVEE
BANK PROTECTION
AERIAL CABLE CROSSING
COMMERCIAL DOCK
RIVER GAGE
GOVERNMENT LIGHT



7 3
VICTOR
Site to be Dredged
63,885
11/68
Culvert ?
Blackhawk Park Slough
DUCK LAKE
IOWA RIVER
SLOUGH
MINNESOTA
873
872
871
870
W A
COUNTY
BATTLE ISLAND
SLOUGH
BATTLE
BLACK HAWK MEMORIAL PARK
BATTLE
35
LEGEND
LEVEE
BANK PROTECTION
AERIAL CABLE CROSSING
COMMERCIAL DOCK
RECREATIONAL SITE
RECREATIONAL SITE WITH RAMP
COMMERCIAL RECREATIONAL SITE
HISTORIC SITE
RIVER GAGE
GOVERNMENT LIGHT
GOVERNMENT DAYMARK
GOVERNMENT LIGHT-DAYMARK
GOVERNMENT LIGHTED BUOY
MOORINGS
MILEAGE ABOVE OHIO RIVER



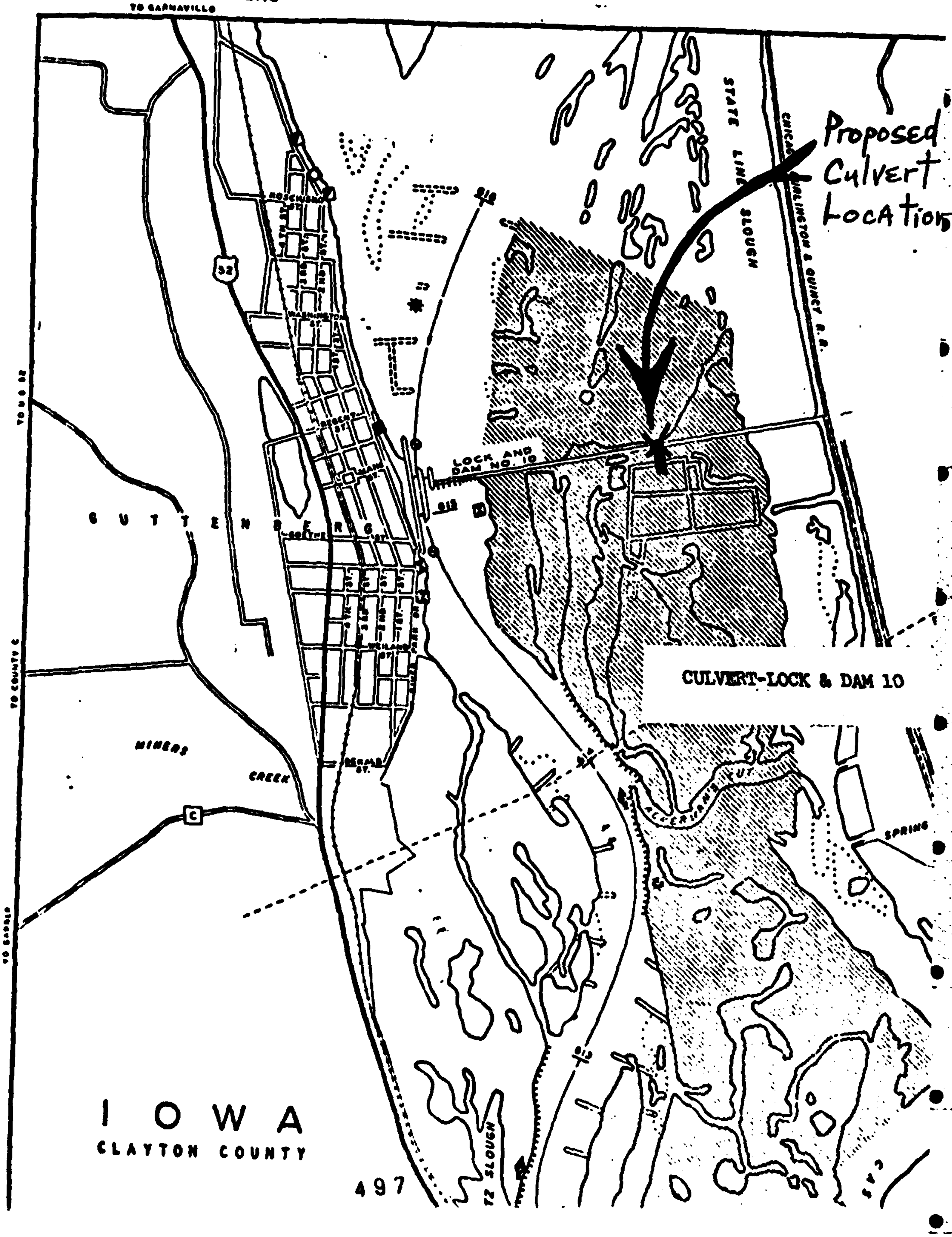
possible fill Areas
Filled
Area to be dredged to Notch dike Wall
35,643
5/70
KIESELHORSE BAY
WHITMAN
CHICAGO MILWAUKEE ST PAUL & PACIFIC RAILROAD
FOUNTAIN CITY
HADDOCK SLOUGH
61
INDIAN Creek
Fountain City Bay
O T A

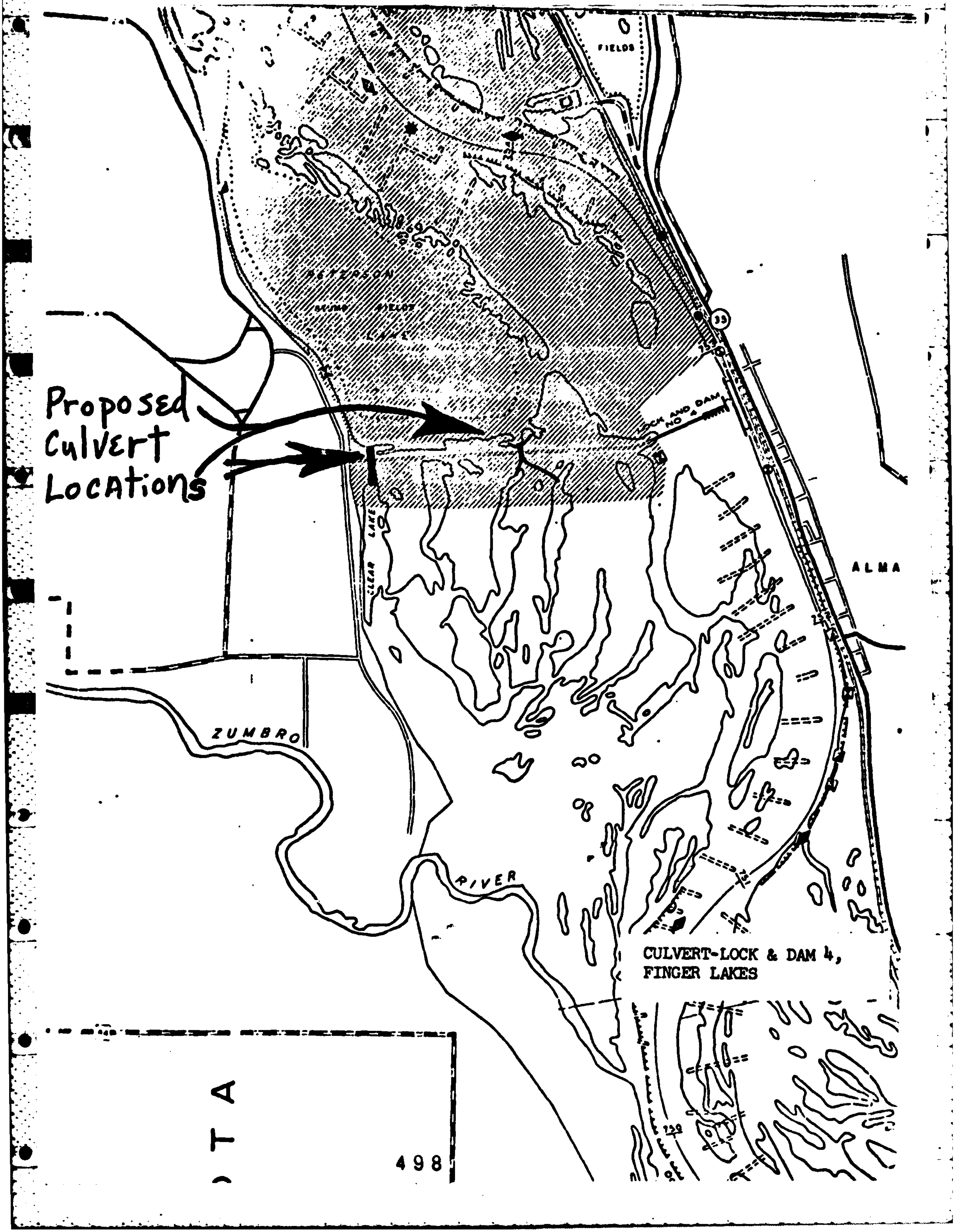


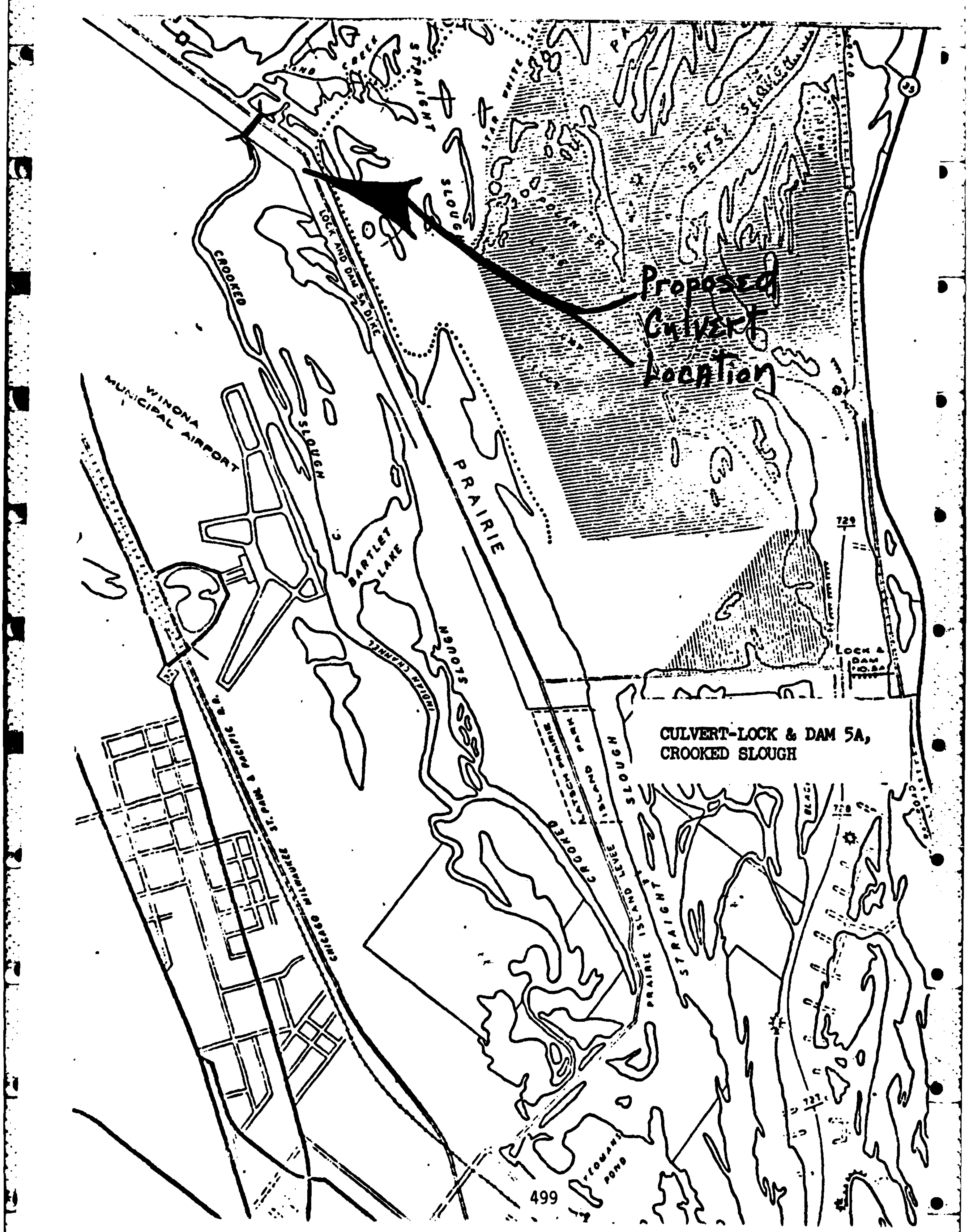
CULVERT A & B

LOCK & DAM 5, FOUNTAIN CITY BAY

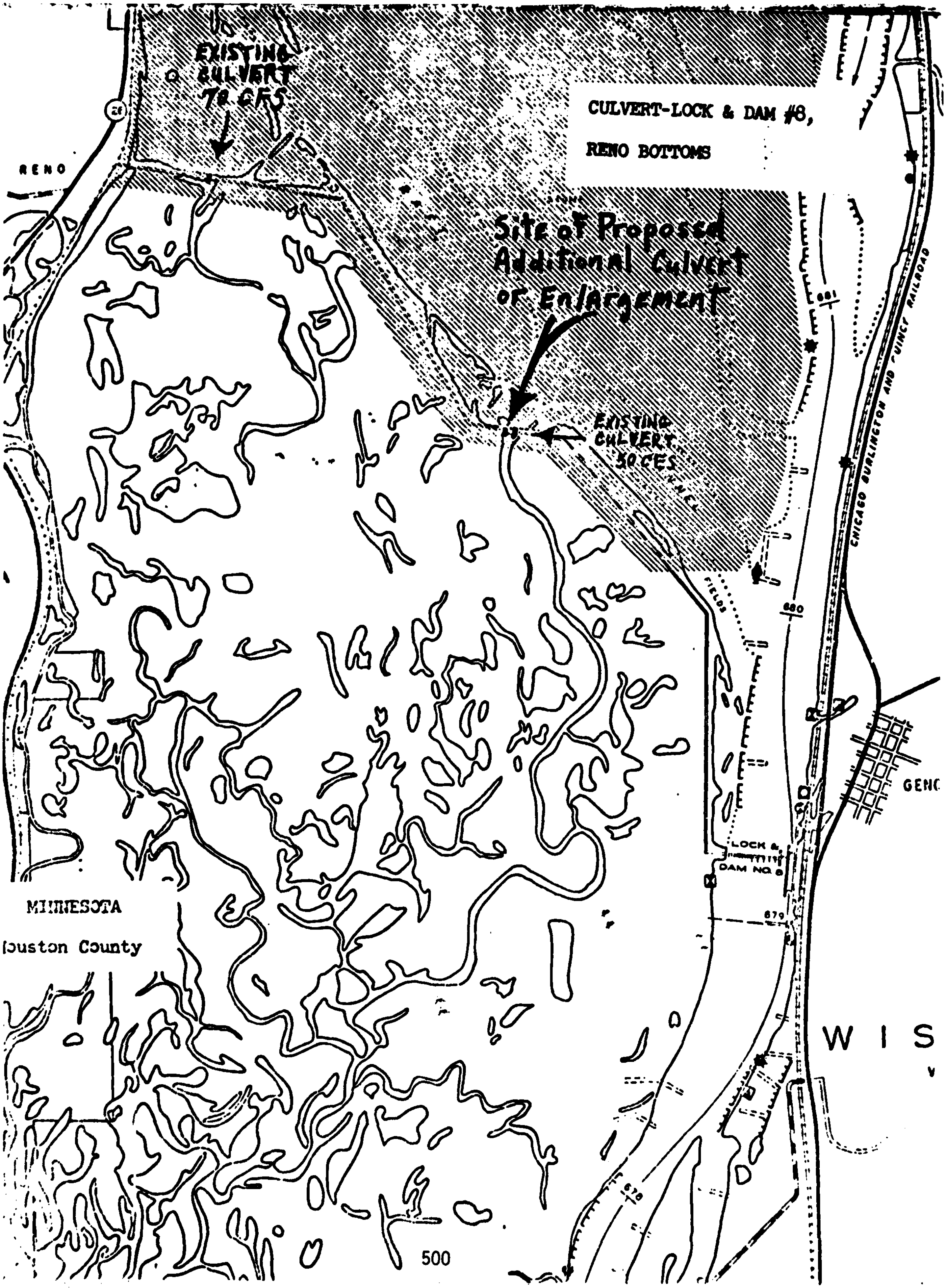
CORPS OF ENGINEERS




Proposed
Culvert
Locations
FIELDS
LOCK AND DAM NO 4
ALMA
ZUMBRO
RIVER
CLEAR LAKE
CULVERT-LOCK & DAM 4,
FINGER LAKES
498



CULVERT-LOCK & DAM 5A,
CROOKED SLOUGH


CULVERT-LOCK & DAM #8,
RENO BOTTOMS
EXISTING CULVERT 70 CFS
RENO
Site of Proposed Additional Culvert or Enlargement
EXISTING CULVERT 50 CFS
CHICAGO BURLINGTON AND QUINCY RAILROAD
681
680
679
FIELDS
LOCK & DAM NO. 8
GENC
MINNESOTA
ouston County
WIS

APPENDIX K

SCWG RECOMMENDED SPOIL DISPOSAL

SITES FOR FOUR SIDE CHANNEL OPENINGS (1978).

NV 3/13

Great River Environmental Action Team

March 15, 1978

Mr. Dennis Cin
U.S. Army, Corps of Engineers
Operations & Maintenance Branch
U.S. Post Office & Custom House
St. Paul, MN 55101

Dear Mr. Cin:

In response to your request to the Side Channel Work Group, we have provided recommendations for spoil disposal sites for four side channels which you indicated would be dredged by the Corps this dredging season. For side channels with more than one possible disposal site recommendation, we have listed the disposal sites in priority order.

Bullet Chute
1. Isle LaPlume (Pool 8)
2. Private property at Dresbach, Minnesota
3. Richmond Island (existing spoil site)

Ferry Slough
1. Landing at Genoa power plant
2. Pump to Gantenbin property (conditional; if done in conjunction with a general site improvement plan which would include a road raising, culvert installation, and the reopening of some sloughs in the Gantenbin property area).
3. Adjacent to the highway at Victory, Wisconsin
4. At non-wetland sites adjacent to the railroad tracks and highway near De Soto, Wisconsin

Hummingbird Slough
1. At non-wetland sites adjacent to the railroad tracks and highway near De Soto, Wisconsin
2. Southwest of the fly ash pit of the Interstate Power plant in Lansing, Iowa
3. Lansing baseball diamond (may require coordination with the city and/or state concerning land use)

Wyalusing Slough
1. Wyalusing gravel pit

If there is a need for maps and details, please contact me.

Although it was not included in the Corps public notice, the SCWG would still like you to consider the small side channel opening project at Indian Slough. Some background material on Indian Slough is enclosed.

Thank you for your consideration and efforts.

Sincerely,

Michael J. Vanderford
Chairman, Side Channel Work Group

enc.

cc: J. Scott
Wayne Knott

APPENDIX L

GREAT RECOMMENDATION TO THE

COE TO CONSTRUCT CULVERTS AT L/D #4

M Vanderford

GREAT

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725-4690

NCSED-PB

14 April 1978

Colonel Forrest T. Gay, III
District Engineer
U.S. Army Engineer District, St. Paul
Corps of Engineers
1135 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Colonel Gay:

The Great River Environmental Action Team (GREAT I) is a multiagency cooperative group working to develop a management plan for the St. Paul District portion of the Upper Mississippi River compatible with commercial navigation, recreation and fish and wildlife. Part of the program is to recommend and facilitate immediate actions which will have significant benefits to either the 9-foot channel maintenance program or the natural resources of the river. We believe one such action is now appropriate. The following information details our recommendation and the justification for this action.

1. Recommendation for Action by the U.S. Army Corps of Engineers:

GREAT I recommends that additional culverts be constructed through the dike of lock and dam 4 to provide freshwater flow to Lake 1, Lake 2, Lake 3 and Clear Lake (part of the "Finger Lakes" below lock and dam 4, inclosure 1). We understand that the Corps has existing authority to do such work to rectify design deficiencies in the construction of the locks and dams. GREAT I believes that such a deficiency exists at lock and dam 4 and that the Corps should use its authority to construct additional culverts through the dike.

2. Justification for Recommendation:

GREAT I has been working since the spring of 1975 to determine what remedial actions were needed and practical. In that time the representatives on the Side Channel Work Group of GREAT I have collected

data and information which we believe justify the construction of at least two culverts in addition to the culvert constructed at Lower Peterson Lake in 1967.

The Lake City area office of the Minnesota Department of Natural Resources (MDNR) conducted extensive field surveys in the "Finger Lakes" area from 1975 through 1977. The MDNR's resulting report (inclosure 2) makes a strong case for supplying freshwater flow to four lakes (1, 2, 3, and Clear Lake; see pages 7 and 8 of the MDNR report). The report, released in the spring of 1977, documents the critically low oxygen levels which occur in these lakes during the winter. These low dissolved oxygen levels severely limit the value of these lakes for overwintering of fish as well as indicating significant eutrophication problems. Other parameters documented in the report further indicate the need for freshwater flow.

The U.S. Fish and Wildlife Service (FWS) has been concerned about the poor water quality in the "Finger Lakes" since the 1940's (see inclosure 3, letter from Regional Director Burwell). In response to the concern by the Service, the Corps placed the culvert which now exists at Lower Peterson Lake. The subsequent inventigation by the MDNR and work by St. Mary's College of Winona have shown that the culvert placed at Peterson Lake has proved inadequate to take care of the entire problem, though it has provided much needed relief for some of the area. The original concern of the FWS over water quality still exists.

GREAT I believes that the biological data collected are sufficient to justify the construction of additional culverts at lock and dam 4. A significant biological problem exists in Lakes 1, 2, and 3 and to a lesser degree in Clear Lake. The data show that construction of additional culverts through lock and dam 4 would remedy the biological problems observed.

The primary benefit derived from the construction of the recommended culverts would be the improvement of the "Finger Lakes" as an area for fish spawning, feeding and overwintering. The culverts would also provide a valuable tool for intensive management of the area for waterfowl feeding habitat in the future. The construction of the culverts would not infringe upon the prerogatives of the Upper Mississippi Wildlife and Fish Refuge, which has management jurisdiction in the area.

Should the Corps concur in the recommendation of GREAT I and initiate steps to construct the culverts at lock and dam 4, a monitoring program would be initiated to quantitatively document the effects of the culverts on the "Finger Lakes." This monitoring information would be of value to

the Corps and the ongoing GREAT river management program. The FWS (St. Paul Field Office and the Upper Mississippi Refuge) would be responsible for assuring that such a monitoring program is initiated.

3. Specific Suggestions:

Several culvert design suggestions are included with our general recommendations to indicate what is generally believed necessary to accomplish a good project at the "Finger Lakes." They are included primarily to clarify the scope and concepts that GREAT I has in mind with regard to the recommended culverts.

a. A culvert or culverts should be constructed to provide flow to Lakes 1, 2, and 3. A 30 cfs capacity (at low control pool) to each lake is estimated to be adequate to alleviate the oxygen problems. It appears that it may be difficult to provide a culvert directly to Lakes 1 and 2. It may be more cost efficient to construct one culvert at the head of Lake 3 and run diversion pipes to Lakes 1 and 2 (see suggested design; inclosure 4). Control gates to each lake are requested.

b. A separate culvert should be provided to Clear Lake. A capacity of 30 cfs at low control pool is considered adequate to alleviate the biological problems in Clear Lake.

c. Slanted trash racks similar to the one placed on the culvert at Peterson Lake should be installed on all culverts at lock and dam 4.

d. The culverts should each have both protected gates and stoplog controls to allow for variable management techniques. The gates should be as tamper proof as possible.

e. The gates should be managed as a joint responsibility of the MDNR (Lake City office) and the Upper Mississippi Refuge (Trempealeau office), with specific coordination with the Corps (through the lockmaster at lock and dam 4).

GREAT I appreciates your consideration of this recommendation. We request that you keep us informed as to the status of the recommendation as the Corps reviews and evaluates its merits.

Sincerely,

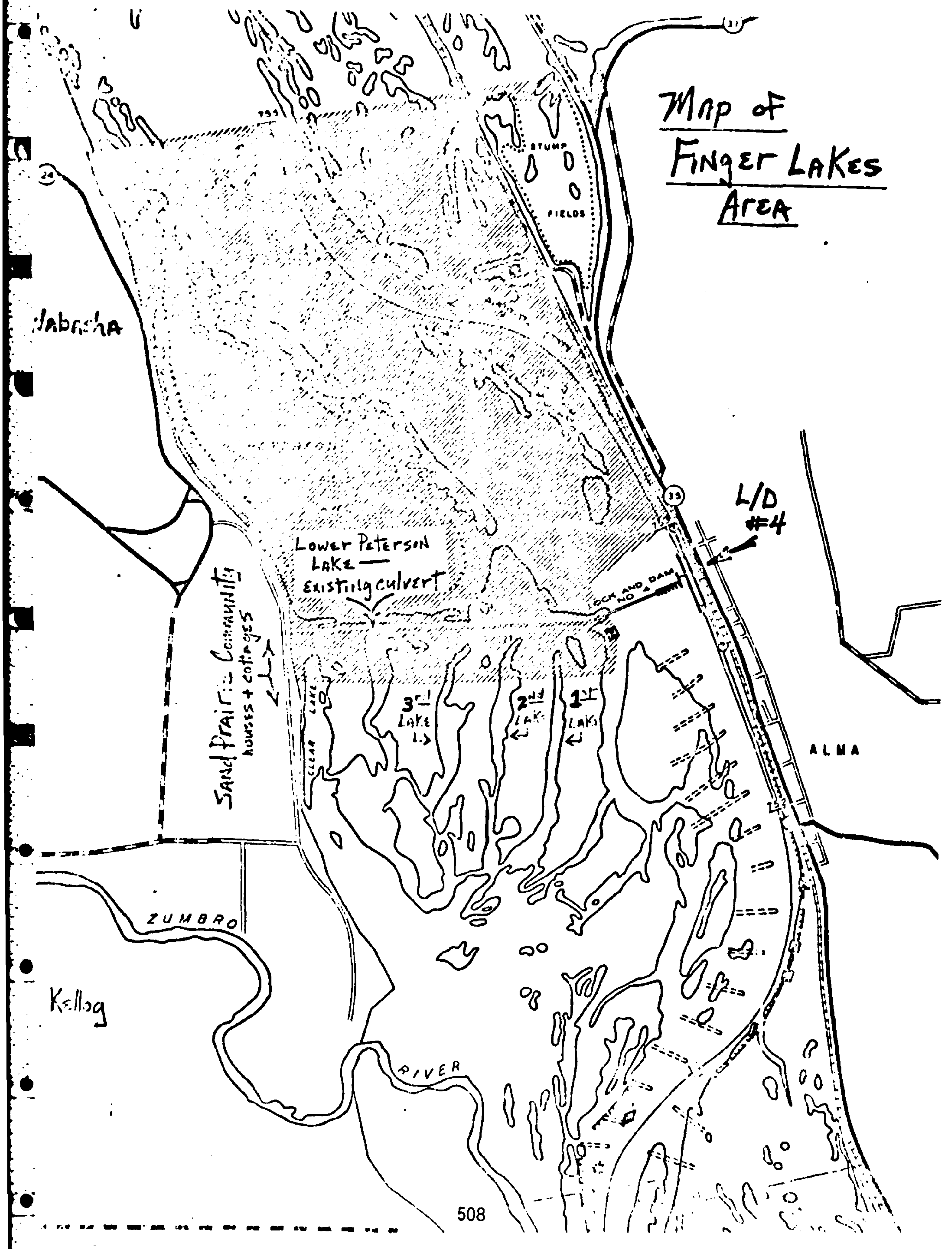
Wayne A. Knott

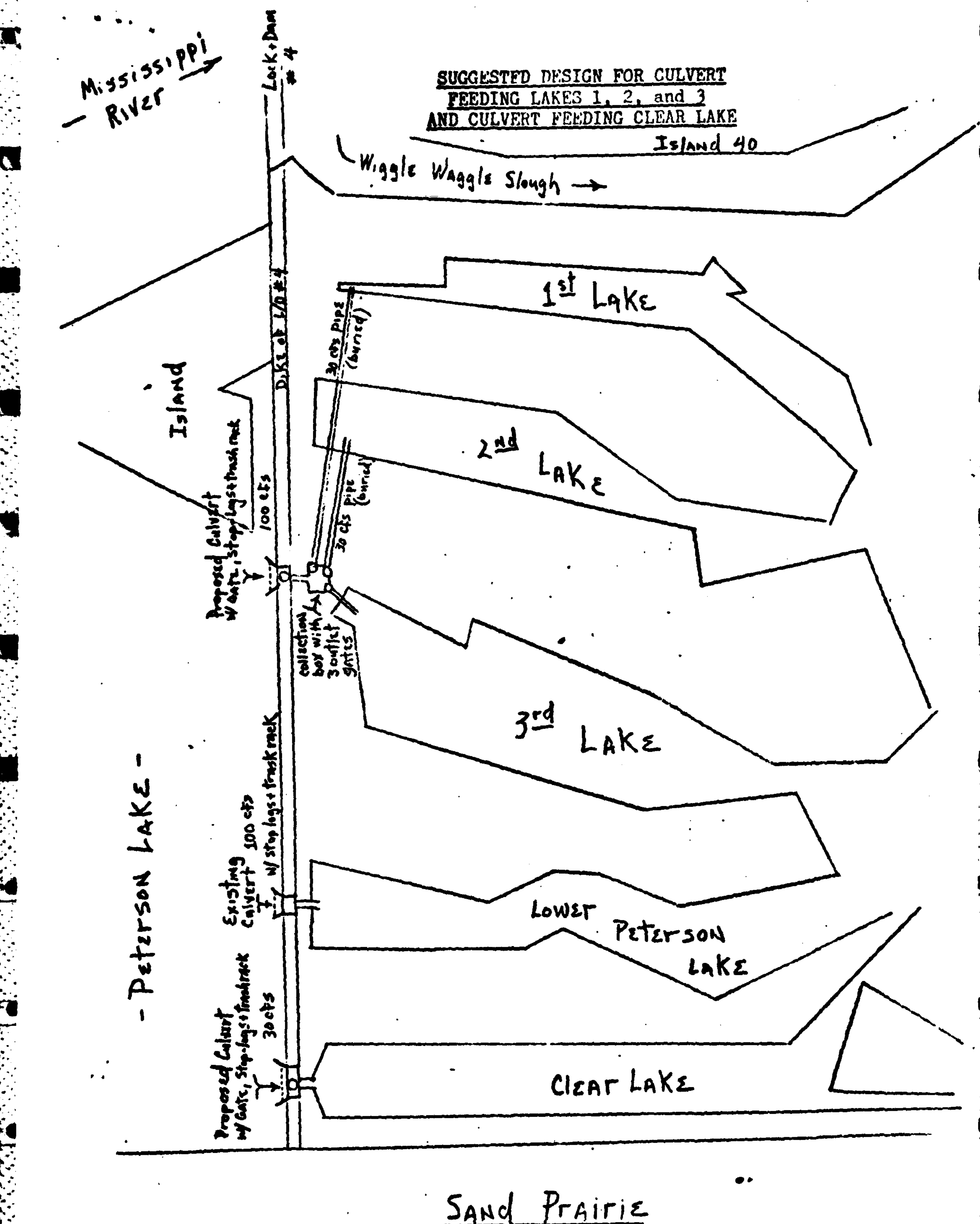
WAYNE A. KNOTT
Cochairman, GREAT I

Donald J. Peterson

DONALD J. PETERSON
Cochairman, GREAT I

4 Incl
as


Map of
Finger Lakes
Area
Wabasha
Kellog
STUMP
FIELDS
L/D
#4
OCK AND DAM NO 4
Lower Peterson
Lake —
Existing culvert
Sand Prairie Community
houses + cottages
CLEAR LAKE
3rd Lake
2nd Lake
1st Lake
ALMA
ZUMBRO
RIVER
35
24


SUGGESTED DESIGN FOR CULVERT
FEEDING LAKES 1, 2, and 3
AND CULVERT FEEDING CLEAR LAKE
Mississippi River
Lock + Dam # 4
Island 40
Wiggle Waggle Slough
1st LAKE
Island
Dike at L/D #4
30 cfs pipe (buried)
2nd LAKE
30 cfs pipe (buried)
Proposed Culvert W/Gates, Stoplogs + Trashrack
100 cfs
collection box with 3 outlet gates
3rd LAKE
- Peterson LAKE -
Existing Culvert W/stoplogs + trashrack 100 cfs
Lower Peterson LAKE
Proposed Culvert w/Gates, Stoplogs + trashrack 30 cfs
Clear LAKE
SAND PRAIRIE

Incl 4

APPENDIX M

MDNR SURVEY REPORT OF THE FINGER

LAKES, BELOW L/D #4

Opaque Vell, 6 att

Feb. 1977

MINNESOTA DIVISION OF FISH AND WILDLIFE
Section of Fisheries

Mississippi River Survey
Finger Lakes - River Mile 752.6
Pool 5 - Wabasha County

Federal Aid Project - Statewide Fish and Wildlife Surveys - FW-1R-21 - Study VI

Type of Survey - Mississippi River Bottoms Survey

Dates of Survey, Mapping, and Photo Nos. - Dates of survey - Jan. 17, Dec. 17, 1975; July 23, Aug. 2,4,11,12, Oct.7, Dec. 17, 1976; Feb. 7, 1977

Aerial photography used in mapping - flown August 27, 1973 - Sheet No. 457-4-185-23 - U.S. Army Corps of Engineers Environment Study Maps.

Field Crew - Gary Grunwald, Larry Watson, Vern Haglund, Mark Ebbers, Dale Sogla

Area Name - Finger Lakes
Other - Clear Lake area, Lower Peterson area, Alma Dike area

Area Identification - T.110N, R.10-9W., S.19,20
Area surveyed is located at Mississippi River Mile 752.6.
This area is immediately below the dike of the U.S. Army Corps of Engineers Lock & Dam #4.
(River Miles indicate distance above the mouth of the Ohio River)

Land Ownership - The area is included in the Upper Mississippi River Wildlife and Fish Refuge - U.S. Fish and Wildlife Service.

County - Wabasha County, Minnesota.

Nearest Town - 1 mile west of Alma, Wisconsin.

Accessibility - A boat ramp is located on the west shore of Clear Lake, and maintaine by the owner of a private campground located there. Area may also be reached by walking onto the dike from the Minnesota shore.

Other Access Areas - A public boat landing is located at Alma, Wisconsin, River Mile 752.0. Access to the finger lakes from the main channel of the river is possibl with small boats, but is difficult due to depth of water and obstructions (falle trees, etc.).

Reason for Survey - The area is included in an inventory of fish and wildlife habitat of the Mississippi River bottoms.

Survey Request - Bruce Hawkinson, Lake City Area Fisheries Manager

Previous Investigations -

a. Upper Mississippi River Habitat Classification Survey - March 1971, Sternberg, Minnesota DNR

b. Phase III Report - Environmental Impact Study of Pool 5 of the Northern Section of the Upper Mississippi River Valley - Fremling, Winona State College, 1973

c. Winter dissolved oxygen levels 1963-1965, Lake City Fisheries files

Lake Areas:

Clear Lake	- 27 acres
Lower Peterson	- 19 acres
3rd Lake	- 31 acres
2nd Lake	- upper-19 acres (above beaver dam); lower-9 acres (below beaver dam
1st Lake	- 27 acres

(Map #1 shows the acreage boundaries.)

Depths: Map #2

Shoreline Distance Surveyed:

Clear Lake	- 6,500 feet
Lower Peterson	- 7,100 feet
3rd Lake	-11,100 feet
2nd Lake	- upper-5,200 feet; lower-6,200 feet
1st Lake	- 9,100 feet

Total of area surveyed - 45,200 feet

Inlets and Outlets - An aeration culvert to provide water flow to the area below the dike is located at the upper end of Lower Peterson Lake. The complex route of the flow is best shown on Map #3.

Water Level Controls - Prior to placement of a protective grate over the inlet of the aeration culvert, the normal water levels of the area surveyed were controlled by debris (stumps, logs, etc.) clogging the opening. A grate was installed in 1976 and no further problem with water levels is foreseen. During normal water conditions this culvert is the primary factor controlling water levels in the area. Corps of Engineers Lock and Dam #4, River Mile 752.8, also regulates the level of the area but to a lesser degree.

Several beaver dams are also present in the area and are discussed under Special Problems.

Benchmark - Top of a green steel fencepost on a wooded island located approximately 1500 feet south of the lower end of the 3rd lake (see map #3). Water level was 3.3 feet below the top of the post. The benchmark was established August 16, 1976. The river level was normal and stable during all periods of this survey.

Nature and Use of Immediate Watershed - See Upper Mississippi River Habitat Classification Survey

Topography: Flood plain forest islands, marsh areas, Lock & Dam #4 dike area, and sand prairie terrace.

Land Use: Immediate - 90% flood plain forest
5% private homesites
5% Government dike

Vicinity - 70% flood plain forest
25% private homesites
5% Government dike

Nature and Use of Shoreline - Area surveyed is bordered on the north by the dike for Lock & Dam #4. This dike is heavily used by people for various activities (fishing and hunting access, bird watching, etc).

The area is bordered on the west by an elevated sand prairie terrace on which 30 private cabin or home sites and a private campground are located.

Shoreline Development - 30 private cabin sites on Clear Lake and the government dike on the northern boundary are the only shoreline developments on the shoreline.

Evidence and Extent of Erosion and Pollution - Sand is being carried into the area surveyed by high water flows. (See map #3) This problem is covered in depth in the Special Problems section.

Water Pollution - None noted; no water samples were taken.

Water Turbidity and Color - The following secchi disc readings were taken on August 2, 1976. All readings are recorded in inches. The readings were taken at the bottom sampling stations (Map #3).

Site	Station No.	Reading	Color
Clear Lake*	10	6	Brown
	9	4	Brown
Lower Peterson	8	10	Brown
	7	13	Brown
3rd Lake	6	12	Brown
	5	12	Brown
2nd Lake	4	8	Brown
	3	42	Clear
1st Lake*	2	4	Brown
	1	7	Brown

*The turbid conditions present in 1st Lake and Clear Lake appeared to be due to large carp concentrations present throughout these areas.

Bottom Soil Types - Table I.

Bottom Soil Type Percent Occurrence - Of the 11 stations sampled, silt occurrence was 80%, sand 10%, sand and silt, 10%.

Water Quality - No water sample taken.

Emergent Vegetation - Map #3 shows marsh areas made up of predominately sedge (*Carex* spp.) with a scattering of cattail (*Typha* spp.) and bulrush (*Scirpus* spp.). (Also see Table II.)

Submerged Vegetation - Table II.

Algae - Filamentous algae was noted near Station #3 in the 2nd lake (light distribution).

Plankton and Insects - Table I.

Waterfowl Habitat - Good to excellent for puddle ducks; 1 wood duck and 3 hen mallards were sighted during the survey.

Furbearer Habitat - At the time of survey there were 4 active beaver colonys in the area. Good muskrat, mink, raccoon and fox habitat is present. Tracks of these species were noted during the survey.

Other Wildlife of the Area - The following were sighted during the survey: great blue heron, common egret, pileated woodpecker, baltimore oriole, red winged blackbird, and bald eagle. Deer tracks were noted throughout the area. A heron rookery is located approximately 1/2 mile south of the benchmark.

Fishery - a. Species Composition of the area - Table III
b. Natural Reproduction of Fish - Table IV. A through D.
c. Fish and Turtle Abundance - Table V. A through E and Table VI. (Table VI is composed of fish sighted and positively identified with the boom shocker but not captured.)
d. Fish Sizes - Table V. A through E.
e. Fish Age - No scale samples taken. (See Table V. A through E for length-frequency)

Fish sampling data from upper 2nd Lake is absent due to the lake being a solid bed of vegetation, with the only open water area in the center. Access was restricted to a canoe portaged in through the woods. Fish sightings from the canoe were possible due to water clarity but the only species positively identified were young-of-the-year largemouth bass and bluegills. The shocking data for lower 2nd Lake would not represent the total area of 2nd Lake.

Fish Spawning Conditions - The area surveyed provides excellent spawning habitat for largemouth bass, bluegills, crappies, whitebass, catfish, carp, buffalo, and forage species. The large areas of marsh habitat (map #3) when flooded, provide excellent spawning habitat for northern pike.

Numerous trees that have fallen into the water through the area provide good shelter for largemouth bass and panfish.

As no fish sampling was done during the spring of the year, it is difficult to assess the exact utilization of the area by different species. As the area is accessible to all fish species of the Mississippi River during spring high water levels, various species not sampled undoubtedly use this area.

Fish Diseases and/or Parasites - None noted.

Clam Beds - No clams or shells were found within the survey area. No clam bar sampling was done.

Lake Conditions and Fishing - From observation the following areas are known to be used by fishermen: Clear Lake, 3rd Lake and the area by the aeration culvert. A creel census conducted in Pool 5 during the years of 1962-63, 1967-68, and 1972-73, included the areas surveyed. However because of the large area involved in Pool 5, the data was compiled using large sections of the river. It is not felt that a reliable estimate of the fishing pressure and success for the area surveyed can be drawn from the data available. It is known from observation that crappies, white bass, walleye, sauger, bluegill, catfish, and northern pike are taken with regularity in the area by sport fishing.

The area is also used by commercial fishermen for seining, setlining, and gillnetting. Major species taken are carp, buffalo, and catfish at various times of the year.

Special Problems - The main outlet of the Finger Lakes during normal flow is into Wiggle Waggle slough on the eastern boundary of the area. (Map #3) However during high water levels, the flow from the main channel enters through this outlet channel and also the north end of 1st Lake. (Map #1)

Large amounts of sand are being carried into the outlet area and the north end of 1st Lake during this high water. (Map #3) The main source of the sand in the outlet area is thought to be from the north end of Island #40. This end of the island initially was protected from erosion with rock bank protection. High water levels have eroded the sand face of the island away from the bank protection approximately 135 feet. This former bank protection extends 2 feet above the water surface during normal water periods. When water levels rise and the rock area is not visible, it becomes extremely hazardous to boaters using the area. Located in the tailwaters of the dam, this hazard is in an extremely high-use area.

There is an old beaver dam on the middle section of 2nd Lake and another on the small pond below 3rd Lake. (Map #3) The small pond is 3 acres in size and the portion of 2nd Lake above the beaver dam is 19 acres. These dams are no longer used or maintained by beaver and high water flows are not sufficient to remove them. The dam on 2nd Lake has a two-foot head of water and the one on the small pond below 3rd Lake has a one-foot head. Largemouth bass, bluegill

crappies, and northern pike in stress were noted at a small area of open water in the small pond.

Due to the low dissolved oxygen levels present on February 7, 1977, (Table VII), a winterkill of fish is again expected in the small pond and the 2nd Lake.

Winter dissolved oxygen levels in 1st, 2nd, and Clear Lake also show severe depletion at the stations monitored. (Table VII) Fish in these areas are able to move to oxygenated areas provided by flow from the aeration culvert. However this forced movement out of preferred habitat may cause high mortality rates due to predation and feeding habits of the various species affected.

Residents of the sand prairie on the western boundary of the area have expressed an interest in obtaining a culvert at the north end of Clear Lake. They have complained of the lake filling in with silt. The residents feel a culvert would deepen Clear Lake and help to provide a boat access to the main channel of the river. In September of 1976, an inspection of the area was made by Dr. Daryl Simons, fluvial hydrologist from Colorado State University. He stated a culvert would not scour out Clear Lake to any appreciable extent, and would not help provide access to the river.

Present Fish Population Status - The areas surveyed supported a diverse fish population. The following major species use the area for rearing and dwelling: northern pike, walleye, sauger, largemouth bass, sunfish spp., crappie spp., catfish spp., white bass, carp and forage spp.

During high water periods this area is accessible to all species of fish present in the Mississippi River.

Fish sampling was done during summer and fall periods and is not felt to totally represent all species that utilize the area.

A good population of various turtle species exists in the area sampled. (Table V, A through E) The area also provides 5 known wintering areas for snapping turtles (*Chelydra serpentina*). These sites are not shown on the maps to prevent exploitation.

Record of Past Management - None

Ecological Classification - Fisheries: Largemouth Bass, Panfish, Catfish, Northern Pike
Wildlife: Waterfowl - Aquatic furbearer

Summary Discussion and Addition Notes - Small boats and canoes provide access to the area with only a minimum of poling required. Access to the main channel of the river from Clear Lake is possible, but would require poling for short distances. The use of large boats in the area is difficult.

The sand movement on the eastern boundary of the area is extending further into the backwaters whenever high water levels occur. The north end of Island #40

is thought to be the main source of this sand and should be contained to prevent further erosion by high water levels.

Old beaver dams in 2nd Lake and the small pond below 3rd Lake should be removed to allow movement of trapped fish out of these areas when dissolved oxygen levels decline during winter months. These two areas comprise a total of 22 water surface acres that presently winterkill.

A recommendation has been made from the Lake City Fisheries office through the Great River Environmental Action Team I to place an additional culvert through the dike. The culvert location (based on this survey) would be placed to provide the 1st, 2nd, and 3rd Lakes with a constant flow of water year around. These lakes do not maintain enough dissolved oxygen to overwinter fish. If only one culvert is placed, it should be constructed so all three lakes receive a water flow. The culvert should also be constructed with a means of regulating the flow.

A culvert placed through the dike is also recommended for Clear Lake but due to priorities based on biological evidence and total acres benefitted, Clear Lake would have the lower priority. Table VII indicates that of all areas sampled, Clear Lake has traditionally had the least problem with dissolved oxygen levels. However, a culvert placed into Clear Lake would improve the overwintering capacity for fish and does deserve future consideration.

No oxygen sampling was done in Lower Peterson Lake due to the constant flow of water. It was assumed to be near the saturation level. Several small areas of open water were noted on the north ends of 2nd and 3rd Lakes due to seepage under the dike, but no increase in dissolved oxygen levels were noted near them.

A ditch that parallels the lower side of the dike from the existing culvert to the north end of the 2nd Lake was formed when the dike was constructed. At first appearance it would seem possible to utilize this ditch for providing water flow to the 2nd and 3rd Lakes from the aeration culvert. However due to beaver activity in the ditch, and several dams present, it is not felt the ditch could be kept open to provide a constant flow. A culvert through the dike into 2nd Lake, with additional piping installed to provide flow to 1st and 3rd Lakes, would assure flow despite beaver activity in the ditch.

Type of Sampling Gear Used -

a. Shocking was done with a boom type shocker, using a Kohler 230 volt A.C. generator, 3 phase current, and controlled with a rheostat to limit amperage output. Amperage used in collecting varied from 5 to 6 amps, depending on water conductivity.
b. Trapnetting was done with standard lake survey single pot nets, mesh size 1/2 inch bar measure. All sets were fished 24 hrs.
c. Shoreline seine dimensions - 40 ft. bag seine, 6 ft. depth, 3/16 inch mesh.
d. Bottom sampling was done with a 6x6 inch Ekman dredge.
e. Dissolved oxygen levels were monitored with a Yellow Springs Oxygen Meter, Model #54.

Credits and Signatures - Preliminary report by Gary Grunwald
Classifications and Recommendations by Gary Grunwald

Approved by Bruce Hawkinson
Bruce Hawkinson 2/7/77
Area Fisheries Manager

James Schneider
James Schneider
Regional Fisheries Supervisor

Federal Aid Project - FW-LR-21. Study VI.

Management Recommendations - Lack of dissolved oxygen to overwinter fish is the main problem of the area. A culvert placed through the dike, similar to the one on Lower Peterson is the best means of alleviating the winter stagnation. This culvert should have a protective grate to prevent clogging and also a means of controlling the rate of flow. The exact placement of the culvert will depend on the District Engineer of the Army Corps of Engineers. It is the biological recommendation of this office that the culvert be placed on the north end of 2nd Lake and additional piping added to allow flow to 1st and 3rd Lakes. With a control on the structure, flow could be maintained at a rate to sustain acceptable levels of oxygen, yet not disrupt the habitat requirements of panfish and other species not conducive to strong current.

The erosion of the north end of the Island #40 should be contained with rock to prevent this sand from moving into the outlet of the Finger Lakes during high water.

The old bank protection which is presently a boating hazard, should be marked with buoys or reduced to a level to permit safe boat passage.

Finger Lakes

Map & Table Index

Number	Topic
Map # 1	Lake Boundries & High Water Flow Patterns
Map # 2	Water Depths
Map # 3	Sand Deposits, Bottom Samples & Marsh Areas
Map # 4	Fish Sampling Stations & Winter Oxygen Sampling Stations
Talbe I	Benthos
Table II	Aquatic Vegetation
Table III	Fish & Turtle Species
Table IVA	Natural Reproduction of Fish - 1st Lake
Table IVB	Natural Reproduction of Fish - 3rd Lake
Table IVC	Natural Reproduction of Fish - Lower Peterson Lake
Table IVD	Natural Reproduction of Fish - Clear Lake
Table VA	Length Frequency Data - 1st Lake
Table VB	Length Frequency Data - Lower 2nd Lake
Table VC	Length Frequency Data - 3rd Lake
Table VD	Length Frequency Data - Lower Peterson Lake
Table VE	Length Frequency Data - Clear Lake
Table VI	Fish Sighted - Boom Shocker
Table VII	Winter Oxygen Levels

Table I

Finger Lakes

Benthic Organisms and Bottom Type

Station Number ( )

Benthic Organisms	1st lake (1)	(2)	2nd lake (3)	(4)	3rd lake (5)	(6)	Lower Peterson Lake (7)	(8)	Clear Lake (9)	(10)
Annelida										
Oligochaeta										
Tubificidae	X		X		X			X	X	
Hirudinea										
Glossiphonidae						X				
Helobdella			X							
Piscicolidae						X				
Isopoda										
Asellidae			X							
Diptera										
Culicidae	X	X		X	X	X		X		
Chironomidae							X			X
Ceratopogonidae	X	X	X		X	X	X	X	X	
Stratiomyiidae						X				
Bottom Type										
Sand					X		X			
Silt	X	X	X	X	X	X		X	X	X

Table II

Finger Lakes
Aquatic Vegetation

Vegetation Types	Station Number (,) 1st Lake (1)	(2)	2nd Lake (3)	(4)	3rd Lake (5)	(6)	Lower (7)	Peterson (8)	Clear Lake (9)	(10)
Coontail *Ceratophyllum demersum*	X	X	X	X						
Sago Pondweed *Potamogeton pectinatus*		X	X							
Curled Pondweed *Potamogeton crispus*	X						X	X		
Floatingleaf Pondweed *Potamogeton natans*		X	X					X		
River Pondweed *Potamogeton nodus*		X			X	X				
Yellow Waterlily *Nuphar variegatum*			X			X				X
White Waterlily *Numphaea tuberosa*			X	X	X	X	X			
Greater Duckweed *Spirodela polyrhiza*					X	X				
Lesser Duckweed *Lemna minor*	X		X	X	X	X				
Watermeal *Wolffia columiana*			X	X	X	X				
Canada Waterweed *Elodea canadensis*			X							
Mud Plantain *Heteranthera dubia*			X							
Yellow Lotus *Nelumbo lutea*							X			
Filamentous Algae						X				
*Bullrush *Scirpus* spp.										
*Cattail *Typha* spp.										
*Sedge *Carex* spp.										

* Composition of marsh area as shown on Map # 1

Table III

Finger Lakes

Fish and Turtle Species

Common Name	Scientific Name
Northern pike	*Esox lucius*
Channel catfish	*Ictalurus punctatus*
Flathead catfish	*Pylodictis olivaris*
White bass	*Morone chrysops*
Pumpkinseed	*Lepomis gibbosus*
Bluegill	*Lepomis macrochirus*
Hybrid sunfish	
Largemouth bass	*Micropterus salmoides*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Yellow perch	*Perca flavescens*
Sauger	*Stizostedion canadense*
Walleye	*Stizostedion vitreum vitreum*
Gizzard shad	*Dorosoma cepedianum*
Carp	*Cyprinus carpio*
Emerald shiner	*Notropis atherinoides*
River shiner	*Notropis blennius*
Spottail shiner	*Notropis hudsonius*
Rosyface shiner	*Notropis rubellus*
Bluntnose minnow	*Pimephales notatus*
River carpsucker	*Carpiodes carpio*
Quillback	*Carpiodes cyprinus*
White sucker	*Catostomus commersoni*
Smallmouth buffalo	*Ictiobus bubalus*
Spotted sucker	*Minytrema melanops*
Silver redhorse	*Moxostoma anisurum*
Shorthead redhorse	*Moxostoma macrolepidotum*
Stonecat	*Noturus flavus*
Brook silverside	*Labidesthes sicculus*
Johnny darter	*Etheostoma nigrum*
Logperch	*Percina caprodes*
Freshwater drum	*Aplodinotus grunniens*
Spiny softshell turtle	*Trionyx ferox*
Brown softshell turtle	*Trionyx mutica*
Western painted turtle	*Chrysemys picta belli*
Snapping turtle	*Chelydra serpentina*
False map turtle	*Graptemys pseudogeographica*

Table IVA

1st Lake

County(ies) Wabasha

Natural Reproduction of Fish - Shoal Water Seining

Seine Measurements: Length 40 feet, Depth 6 feet, Mesh size 3/16 - inch square

	Station Number in ( ) 1 (I)	2 ( )	3 ( )	4 ( )	5 ( )	6 ( )	Totals
		show number of seine hauls made at each station					
Total linear distance covered - feet	50						50 Linear Feet
Greatest water depth - feet	3						
Bottom Soil Type	silt						
Amount of Vegetation ++	light						
River stage	Normal/stable						
Wind Intensity and Direction +							
Time (Military) of Day and Date							
Bench Mark Reading #	3' 4"						

Size and Numbers

Species***	YY**	O*	YY	O	YY	O	YY	O	YY	O	YY	O	Totals YY	Totals O	Totals All
Channel catfish	1														
White bass	7												1		1
Bluegill	45	3											7		7
Black crappie	115	7											45	3	48
Yellow perch	3												115	7	122
Carp		1											3		3
Spottail shiner		6												1	1
Rosyface shiner		2												6	6
River carpsucker	2													2	2
Shorthead redhorse	9												2		2
Log perch		2											9		9
														2	2

++ Heavy, Moderate, Light, None, etc. + Strong, Moderate, Light, Calm.

*** Group separately minnows and darters without identifying them, unless readily identifiable in field. Preserve sample for later identification in laboratory.

** YY - Young-of-year or fingerlings

* O - Others, includes yearlings and adults, minnows and darters.

Distance from top of B.M. to water surface

Table IVB

3rd Lake

County(ies) Wabasha

Natural Reproduction of Fish - Shoal Water Seining

Seine Measurements: Length 40 feet, Depth 6 feet, Mesh size 3/16 - inch square

	Station Number in ( )	show number of seine hauls made at each station					Totals
	1 (I)	2 ( )	3 ( )	4 ( )	5 ( )	6 ( )	
Total linear distance covered - feet	50						50 Linear Feet
Greatest water depth - feet	3						
Bottom Soil Type	silt						
Amount of Vegetation ++	moderate						
River stage	Normal/stable						
Wind Intensity and Direction +							
Time (Military) of Day and Date							
Bench Mark Reading #	3' 4"						

Size and Numbers

Species***	YY**	O*	YY	O	YY	O	YY	O	YY	O	YY	O	Totals YY	Totals O	Totals All
Pumpkinseed	4												4		4
Bluegill	826												826		826
Largemouth bass	9												9		9
Black crappie	44												44		44
Yellow perch	1												1		1
Gizzard shad	2												2		2
Carp	4												4		4
Emeral shiner		2												2	2
River carpsucker	5												5		5
Spottail shiner		43												43	43
Silver redhorse	1												1		1
Shorthead redhorse	30												30		30
Stonecat	1												1		1

++ Heavy, Moderate, Light, None, etc. + Strong, Moderate, Light, Calm.

*** Group separately minnows and darters without identifying them, unless readily identifiable in field. Preserve sample for later identification in laboratory.

** YY - Young-of-year or fingerlings

* O - Others, includes yearlings and adults, minnows and darters.

Distance from top of B.M. to water surface

Table IVC

Lower Peterson Lake

County(ies) Wabasha

Natural Reproduction of Fish - Shoal Water Seining

Seine Measurements: Length 40 feet, Depth 6 feet, Mesh size 3/16 - inch square

	Station Number in ( )		show number of seine hauls made at each station				Totals
	1 (1)	2 ( )	3 ( )	4 ( )	5 ( )	6 ( )	
Total linear distance covered - feet	50						50 Linear Feet
Greatest water depth - feet	3						
Bottom Soil Type	silt						
Amount of Vegetation ++	light						
River Stage	Normal/stable						
Wind Intensity and Direction +							
Time (Military) of Day and Date							
Bench Mark Reading #	3' 4"						

Size and Numbers

Species***	YY**	O*	YY	O	YY	O	YY	O	YY	O	YY	O	Totals YY	Totals O	Totals All
White bass	6												6		6
Bluegill	19												19		19
Largemouth bass		1												1	1
Black crappie	2												2		2
Gizzard shad	107												107		107
River shiner		4												4	4
Spottail shiner		2												2	2
Bluntnose minnow		1												1	1
River carpsucker	4												4		4
Shorthead redhorse	11												11		11
Johnny darter		2												2	2
Log perch		1												1	1
Freshwater drum	1												1		1

++ Heavy, Moderate, Light, None, etc. + Strong, Moderate, Light, Calm.
*** Group separately minnows and darters without identifying them, unless readily identifiable in field. Preserve sample for later identification in laboratory.
** YY - Young-of-year or fingerlings
* O - Others, includes yearlings and adults, minnows and darters.
# Distance from top of B.M. to water surface

Table IVD

Clear Lake

County(ies) Wabasha

Natural Reproduction of Fish - Shoal Water Seining

Seine Measurements: Length 40 feet, Depth 6 feet, Mesh size 3/16 - inch square

	Station Number in ( ) show number of seine hauls made at each station						Totals
	1 (1)	2 ( )	3 ( )	4 ( )	5 ( )	6 ( )	
Total linear distance covered - feet	50						50 Linear Feet
Greatest water depth - feet	3						
Bottom Soil Type	silt						
Amount of Vegetation ++	light						
River Stage	Normal/stable						
Wind Intensity and Direction +							
Time (Military) of Day and Date							
Bench Mark Reading #	3' 4"						

Size and Numbers

Species***	YY**	O*	YY	O	YY	O	YY	O	YY	O	YY	O	Totals YY	Totals O	Totals All
White bass	3												3		3
Bluegill	75												75		75
Largemouth bass	1												1		1
Black crappie	20	3											20	3	23
Yellow perch	4												4		4
Gizzard shad	1												1		1
Carp	2												2		2
Spottail shiner		23												23	23
River carpsucker	3												3		3
Shorthead redhorse	2												2		2

++ Heavy, Moderate, Light, None, etc. + Strong, Moderate, Light, Calm.

*** Group separately minnows and darters without identifying them, unless readily identifiable in field. Preserve sample for later identification in laboratory.

** YY - Young-of-year or fingerlings

* O - Others, includes yearlings and adults, minnows and darters.

Distance from top of B.M. to water surface

Table VA

Fish Sizes

1ST LAKE
Shocking

Lake Finger Lakes

County(ies) Wabasha
Date Sampled: 10-7-76

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Northern Pike	Bluegill	Hybrid Sunfish	Largemouth Bass	White Crappie	Black Crappie	Walleye	White Sucker	Smallmouth Buffalo	Spotted Sucker
3.0 - 3.4						1				1
3.5 - 3.9				2						
4.0 - 4.4		1				1				2
4.5 - 4.9		2								
5.0 - 5.4		3			1		1		1	
5.5 - 5.9			1							
6.0 - 6.4		1		1						
6.5 - 6.9										1
7.0 - 7.4										
7.5 - 7.9						1				
8.0 - 8.4										
8.5 - 8.9					1	1				
9.0 - 9.4										
9.5 - 9.9										
10.0 - 10.4										
10.5 - 10.9						1				
11.0 - 11.4										
11.5 - 11.9										
12.0 - 12.9						1				
13.0 - 13.9										
14.0 - 14.9										
15.0 - 15.9										
16.0 - 16.9										
17.0 - 17.9										
18.0 - 18.9								1		
19.0 - 19.9										
20.0 - 20.9										
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9	1									
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	1	7	1	3	2	6	1	1	1	4

Table . VA

Fish Sizes

1ST LAKE
Shocking
Continued

Lake Finger Lakes

County(ies) Wabasha

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Short-head Rdhorse									
3.0 - 3.4										
3.5 - 3.9										
4.0 - 4.4	1									
4.5 - 4.9										
5.0 - 5.4										
5.5 - 5.9										
6.0 - 6.4										
6.5 - 6.9										
7.0 - 7.4										
7.5 - 7.9										
8.0 - 8.4										
8.5 - 8.9										
9.0 - 9.4										
9.5 - 9.9										
10.0 - 10.4										
10.5 - 10.9										
11.0 - 11.4										
11.5 - 11.9										
12.0 - 12.9										
13.0 - 13.9										
14.0 - 14.9										
15.0 - 15.9										
16.0 - 16.9										
17.0 - 17.9										
18.0 - 18.9										
19.0 - 19.9										
20.0 - 20.9										
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	1									

Table VB

Fish Sizes

LOWER 2ND LAKE
Shocking

Lake Finger Lakes

County(ies) Wabasha

Date Sampled: 10-7-76

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Northern Pike	Bluegill	Largemouth Bass	White Crappie	Black Crappie					
2.0-2.9		2		4						
3.0 - 3.4										
3.5 - 3.9										
4.0 - 4.4										
4.5 - 4.9		2			1					
5.0 - 5.4					1					
5.5 - 5.9		2		1						
6.0 - 6.4			1							
6.5 - 6.9			1	1						
7.0 - 7.4					1					
7.5 - 7.9			1							
8.0 - 8.4				2						
8.5 - 8.9			1							
9.0 - 9.4										
9.5 - 9.9										
10.0 - 10.4					1					
10.5 - 10.9										
11.0 - 11.4					1					
11.5 - 11.9										
12.0 - 12.9			1							
13.0 - 13.9										
14.0 - 14.9										
15.0 - 15.9										
16.0 - 16.9										
17.0 - 17.9										
18.0 - 18.9										
19.0 - 19.9										
20.0 - 20.9										
21.0 - 21.9	2									
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9	1									
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	3	6	5	8	5					

Lake Finger Lakes

3RD FINGER LAKE
Trapnetting
Shocking

Table VC

County(ies) Wabasha
Dates Sampled: 8-12-76; 10-7-76

Fish Sizes

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Northern Pike	White Bass	Bluegill	Largemouth Bass	White Crappie	Black Crappie	Yellow Perch	Walleye	Gizzard Shad	Carp
3.0 - 3.4										
3.5 - 3.9						1				
4.0 - 4.4										
4.5 - 4.9			3			2				
5.0 - 5.4			2				1			
5.5 - 5.9		1	2	1						
6.0 - 6.4			2							
6.5 - 6.9			3			4				
7.0 - 7.4			3	1		7				
7.5 - 7.9						9				
8.0 - 8.4			2			2				
8.5 - 8.9			1	2		4				
9.0 - 9.4						8				
9.5 - 9.9						5				
10.0 - 10.4				1		5				
10.5 - 10.9						4				
11.0 - 11.4						4		1		
11.5 - 11.9						3		1	1	
12.0 - 12.9					1	5				
13.0 - 13.9						2				
14.0 - 14.9										
15.0 - 15.9										
16.0 - 16.9										
17.0 - 17.9	1									
18.0 - 18.9										
19.0 - 19.9										
20.0 - 20.9	1									1
21.0 - 21.9										1
22.0 - 22.9	1									
23.0 - 23.9	1									
24.0 - 24.9	2									
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9	1									
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	7	1	18	5	1	65	1	2	1	2

Table VC

Fish Sizes

3RD FINGER LAKE
Trapnetting
Shocking
Continued

Lake Finger Lakes

County(ies) Wabasha

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	White Sucker	Spotted Sucker	Fresh-water Drum			Spiny Sftshel Turtle	Brown Sftshel Turtle	Painted Box Turtle	Snap-ping Turtle	
3.0 - 3.4										
3.5 - 3.9								2		
4.0 - 4.4		1						1		
4.5 - 4.9								6		
5.0 - 5.4								1		
5.5 - 5.9								5		
6.0 - 6.4							3	1		
6.5 - 6.9							2	1		
7.0 - 7.4							2	2		
7.5 - 7.9		1				1	1	1		
8.0 - 8.4							3		1	
8.5 - 8.9										
9.0 - 9.4									1	
9.5 - 9.9										
10.0 - 10.4						1				
10.5 - 10.9										
11.0 - 11.4		1								
11.5 - 11.9										
12.0 - 12.9										
13.0 - 13.9			1							
14.0 - 14.9										
15.0 - 15.9	1									
16.0 - 16.9		1								
17.0 - 17.9										
18.0 - 18.9										
19.0 - 19.9										
20.0 - 20.9										
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	1	4	1			2	11	20	2	

Table VD

LOWER PETERSON LAKE
Trapnetting
Shocking

Lake Finger Lakes

County(ies) Wabasha

Fish Sizes

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Northern Pike	White Bass	Blue-Gill	Large-mouth Bass	Black Crappie	Sauger	Walleye	Carp	Quill-back	Spotted Sucker
2.0-2.9			3							
3.0 - 3.4				1						
3.5 - 3.9			1							3
4.0 - 4.4			1		2					1
4.5 - 4.9		1			1					1
5.0 - 5.4		1	1	1	4		1			
5.5 - 5.9			1		3					
6.0 - 6.4		2	1							
6.5 - 6.9			2		4				1	
7.0 - 7.4			2	1	5		1			
7.5 - 7.9			1		5					
8.0 - 8.4				1	1					
8.5 - 8.9			1	1	6	1				
9.0 - 9.4					3					
9.5 - 9.9					3					
10.0 - 10.4				1	3					
10.5 - 10.9					2		1			
11.0 - 11.4					2					
11.5 - 11.9										
12.0 - 12.9				1	3					
13.0 - 13.9				1						
14.0 - 14.9				2						
15.0 - 15.9				2						
16.0 - 16.9										
17.0 - 17.9				2						
18.0 - 18.9								1		
19.0 - 19.9										
20.0 - 20.9										
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9	1									
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	1	4	14	14	47	1	3	1	1	5

Lake Finger Lakes

LOWER PETERSON LAKE
Trapnetting
Shocking
Continued

Table . VD

Fish Sizes

County(ies) Wabasha
Dates Sampled: 8-12-76; 10-7-76

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Fresh-water Drum				Brown Softshell Turtle	Painted Box Turtle				
3.0 - 3.4										
3.5 - 3.9										
4.0 - 4.4										
4.5 - 4.9										
5.0 - 5.4										
5.5 - 5.9						2				
6.0 - 6.4					1	1				
6.5 - 6.9										
7.0 - 7.4					2					
7.5 - 7.9					1					
8.0 - 8.4					1					
8.5 - 8.9										
9.0 - 9.4										
9.5 - 9.9										
10.0 - 10.4										
10.5 - 10.9										
11.0 - 11.4										
11.5 - 11.9										
12.0 - 12.9	1									
13.0 - 13.9	2									
14.0 - 14.9										
15.0 - 15.9										
16.0 - 16.9										
17.0 - 17.9										
18.0 - 18.9										
19.0 - 19.9										
20.0 - 20.9										
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	3				5	3				

Finger Lakes

Table VE

Fish Sizes

CLEAR LAKE
Trapnetting
Shocking

County(ies) Wabasha
Dates Sampled: 8-12-76; 10-7-76

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Northern Pike	Flathead Catfish	White Bass	Bluegill	Largemouth Bass	White Crappie	Black Crappie	Yellow Perch	Walleye	Carp
3.0 - 3.4										
3.5 - 3.9								1		
4.0 - 4.4							2			
4.5 - 4.9				2						
5.0 - 5.4							4			
5.5 - 5.9				1			2		1	
6.0 - 6.4			5	4			2			
6.5 - 6.9							2			
7.0 - 7.4				3						
7.5 - 7.9				5		1	2			
8.0 - 8.4				1			1			
8.5 - 8.9				1		3				
9.0 - 9.4						2				
9.5 - 9.9										
10.0 - 10.4							1			
10.5 - 10.9							2			
11.0 - 11.4										
11.5 - 11.9										
12.0 - 12.9							2			
13.0 - 13.9										
14.0 - 14.9										
15.0 - 15.9					2					
16.0 - 16.9										
17.0 - 17.9										
18.0 - 18.9										
19.0 - 19.9										
20.0 - 20.9	1									
21.0 - 21.9	1									
22.0 - 22.9	1									
23.0 - 23.9										1
24.0 - 24.9	4	1								
25.0 - 25.9	1									
26.0 - 26.9	1									1
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9	1									
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	10	1	5	17	2	6	20	1	1	2

Lake Finger. Lakes

Table VE .

CLEAR LAKE
Trapnetting
Shocking
Continued

County(ies) Wabasha

Fish Sizes

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Spotted Sucker	Silver Red-Horse	Short-head Rdhorse	Fresh-water Drum			Brown Softshell Turtle	Snap-ping Turtle	Painted Box Turtle	False Map Turtle
3.0 - 3.4										
3.5 - 3.9										
4.0 - 4.4										
4.5 - 4.9									1	
5.0 - 5.4									3	
5.5 - 5.9										2
6.0 - 6.4				2					3	4
6.5 - 6.9				4			1		2	3
7.0 - 7.4				1						1
7.5 - 7.9									1	
8.0 - 8.4										
8.5 - 8.9										
9.0 - 9.4							1			
9.5 - 9.9										
10.0 - 10.4										
10.5 - 10.9										
11.0 - 11.4								1		
11.5 - 11.9										
12.0 - 12.9		1	1							
13.0 - 13.9	1		1							
14.0 - 14.9	2			1				1		
15.0 - 15.9	2		3							
16.0 - 16.9	1		2							
17.0 - 17.9		1	3							
18.0 - 18.9										
19.0 - 19.9			1							
20.0 - 20.9										
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	6	2	11	8			2	2	10	10

Table VI

FINGER LAKES
Fish Sightings
Boom Shocking

Date	Lake	Species	Adult	Yearling	Young of Year
10-7-76	Clear	Northern Pike	2		
		Crappie Species	8		
		Freshwater Drum	5		
10-7-76	Lower Peterson	Northern Pike	2		
		Bluegill			Abundant*
		Gizzard Shad			Abundant*
		Crappie Species	4		
		Carp	35		
		Emerald Shiner	Abundant*		
		Spottail Shiner	Abundant*		
10-7-76	3rd	Bluegill	5		Abundant*
		Crappie Species	5		Abundant*
		Gizzard Shad			Abundant*
		Spotted Sucker	3		Abundant*
10-7-76	Lower 2nd	Bluegill	5		
		Crappie Species	5		Abundant*
		Carp	20		
		Spotted Sucker			Abundant*
		Brook Silverside	5		
10-7-76	1st	Northern Pike	3		
		Largemouth Bass	1		
		Carp	Abundant*		
		Spotted Sucker			Abundant*
		Shorthead Redhorse			Abundant*

* Too numerous to count

Table VII

Finger Lakes
Dissolved Oxygen Samples

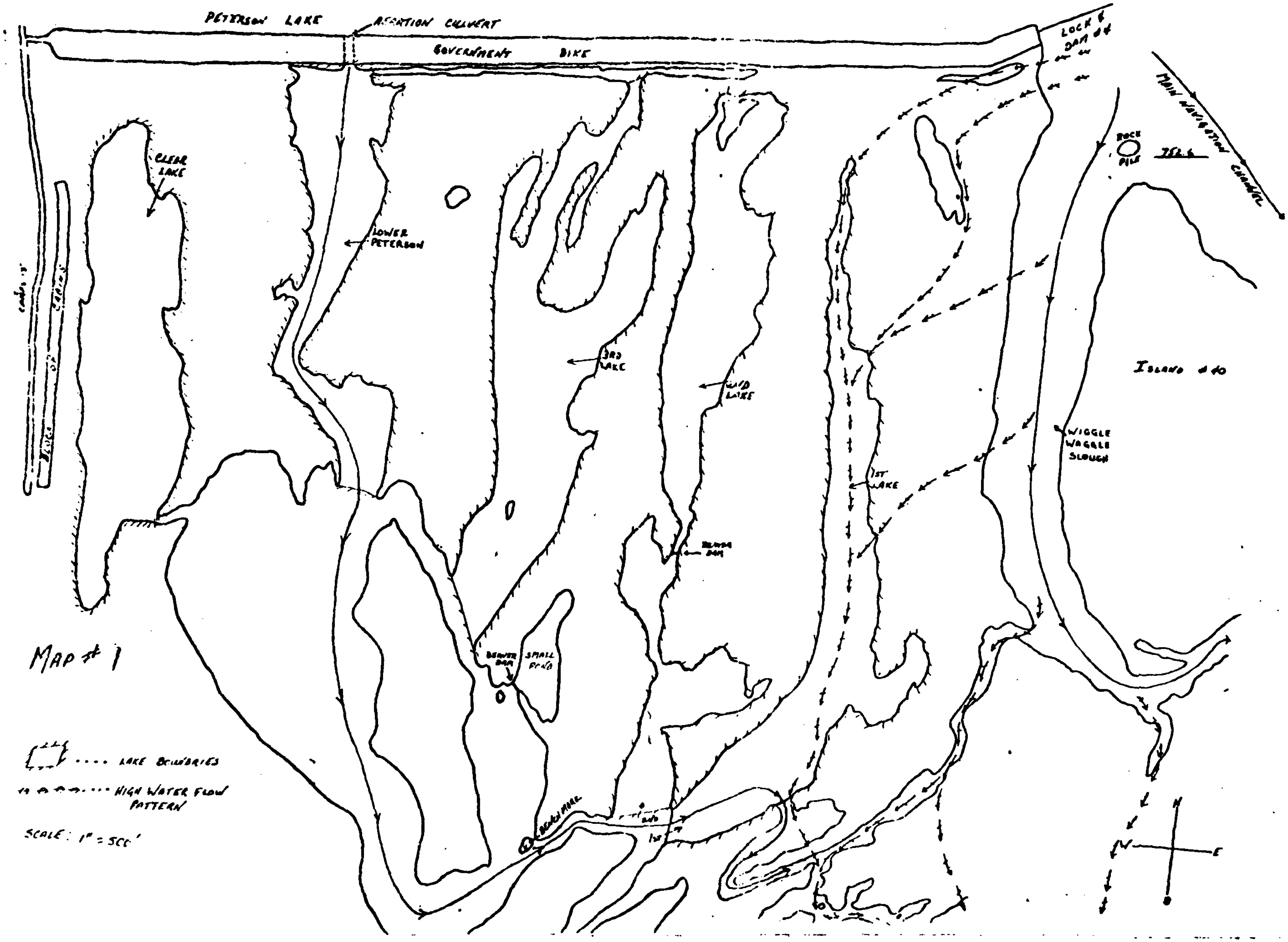
Date	Lake	Station	Sample Depth (ft)	ppm	
2-28-63	Clear		3.0	6.2	
2-28-63	Clear		4.0	4.7	
2-28-63	Clear		5.0	4.0	
2-28-63	Clear		4.0	3.2	
2-10-64	Clear			7.5	
1-17-75	Clear	1	3.5	11.4	74-75
1-17-75	Clear	2	3.5	6.0	
12-16-75	Clear	1	2.5	18.2	75-76
12-16-75	Clear	2	2.5	11.0	
12-17-76	Clear	1	3.0	4.6	
12-17-76	Clear	2	1.0	3.7	
2-7-77	Clear	1	2.5	1.3	76-77
2-7-77	Clear	2	2.5	1.0	
2-28-63	Lower Peterson		4.0	0.0+	
2-28-63	Lower Peterson		3.0	0.2+	
2-28-63	Lower Peterson		3.0	0.3+	
2-28-63	Lower Peterson		4.0	0.9+	
2-10-64	Lower Peterson			5.0+	
2-10-64	3rd			3.0	
1-17-75	3rd	1	4.0	0.8	
1-17-75	3rd	2	4.0	4.4	74-75
1-17-75	3rd	3	4.0	3.4	
12-16-75	3rd	1	3.0	7.6	
12-16-75	3rd	2	4.5	3.6	75-76
12-16-75	3rd	3	4.0	3.6	
12-17-76	3rd	1	3.0	0.6	
12-17-76	3rd	2	5.0	0.6	
12-17-76	3rd	3	3.0	2.3	

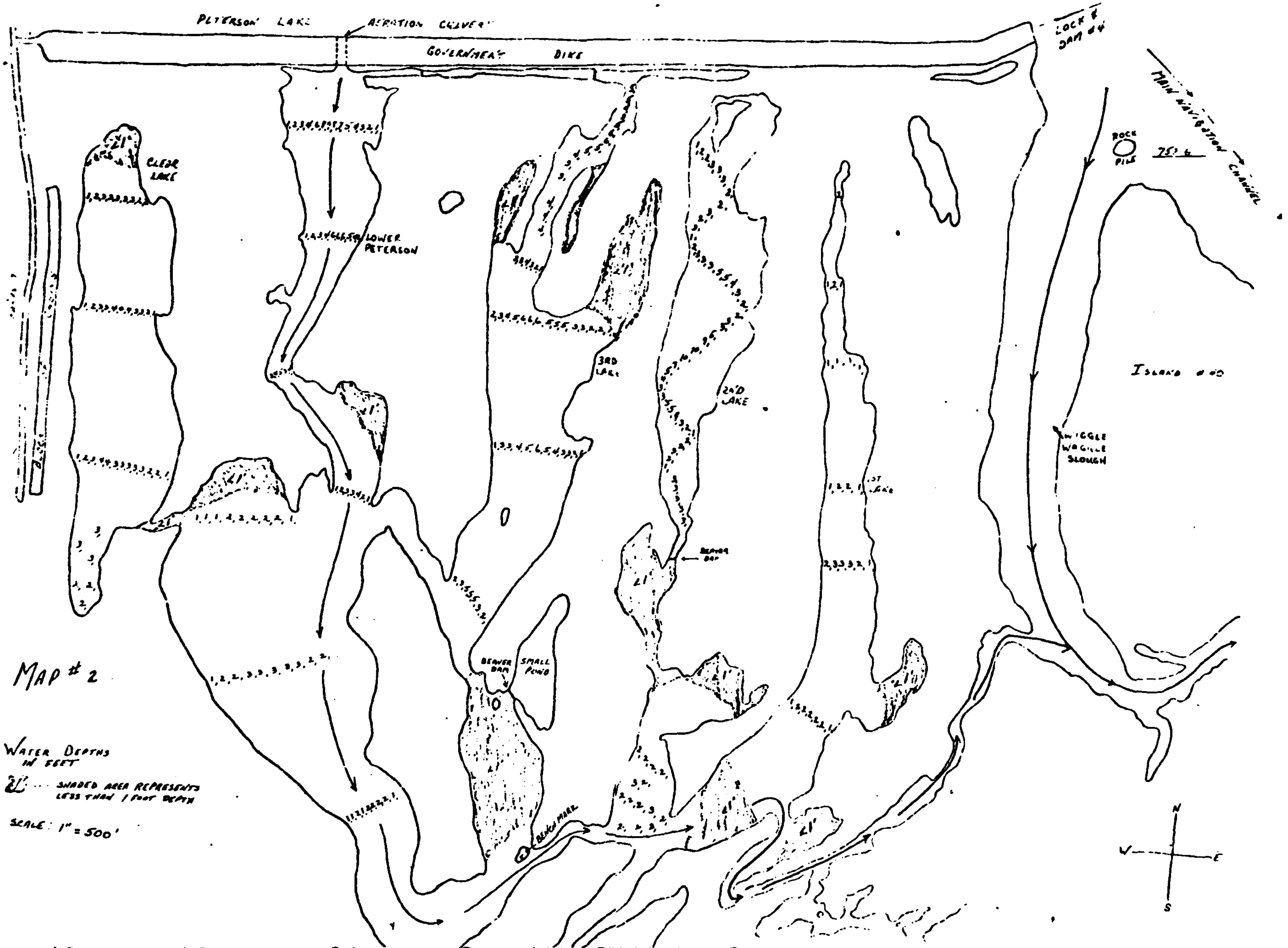
Date	Lake	Station	Sample Depth (ft)	ppm	
2-7-77	3rd	1	3.0	0.8	
2-7-77	3rd	2	2.0	0.9	76-77
2-7-77	3rd	3	3.0	0.9	
12-17-76	Small Pond** Below 3rd Lake		2.0	0.6*	
1-17-75	2nd	1	2.0	0.6*	
1-17-75	2nd	2	6.0	0.2*	74-75
1-17-75	2nd	3	2.5	0.8*	
12-16-75	2nd	1	2.5	3.6*	
12-16-75	2nd	2	4.5	4.2*	75-76
12-16-75	2nd	3	2.0	13.0*	
12-17-76	2nd	1	1.5	0.7*	
12-17-76	2nd	2	5.0	4.2*	
12-17-76	2nd	3	1.5	3.9*	
2-7-77	2nd	2	2.5	0.8*	76-77
2-7-77	2nd	3	2.0	0.8*	
1-17-75	1st	1	2.5	0.6	
1-17-75	1st	2	2.5	0.4	74-75
1-17-75	1st	3	3.0	9.4	
12-16-75	1st	1	2.5	3.4	
12-16-75	1st	2	2.5	3.4	75-76
12-16-75	1st	3	3.0	8.0	
12-17-76	1st	1	2.5	2.6	
12-17-76	1st	2	2.5	3.5	
12-17-76	1st	3	3.0	3.5	
2-7-77	1st	2	2.0	1.2	76-77

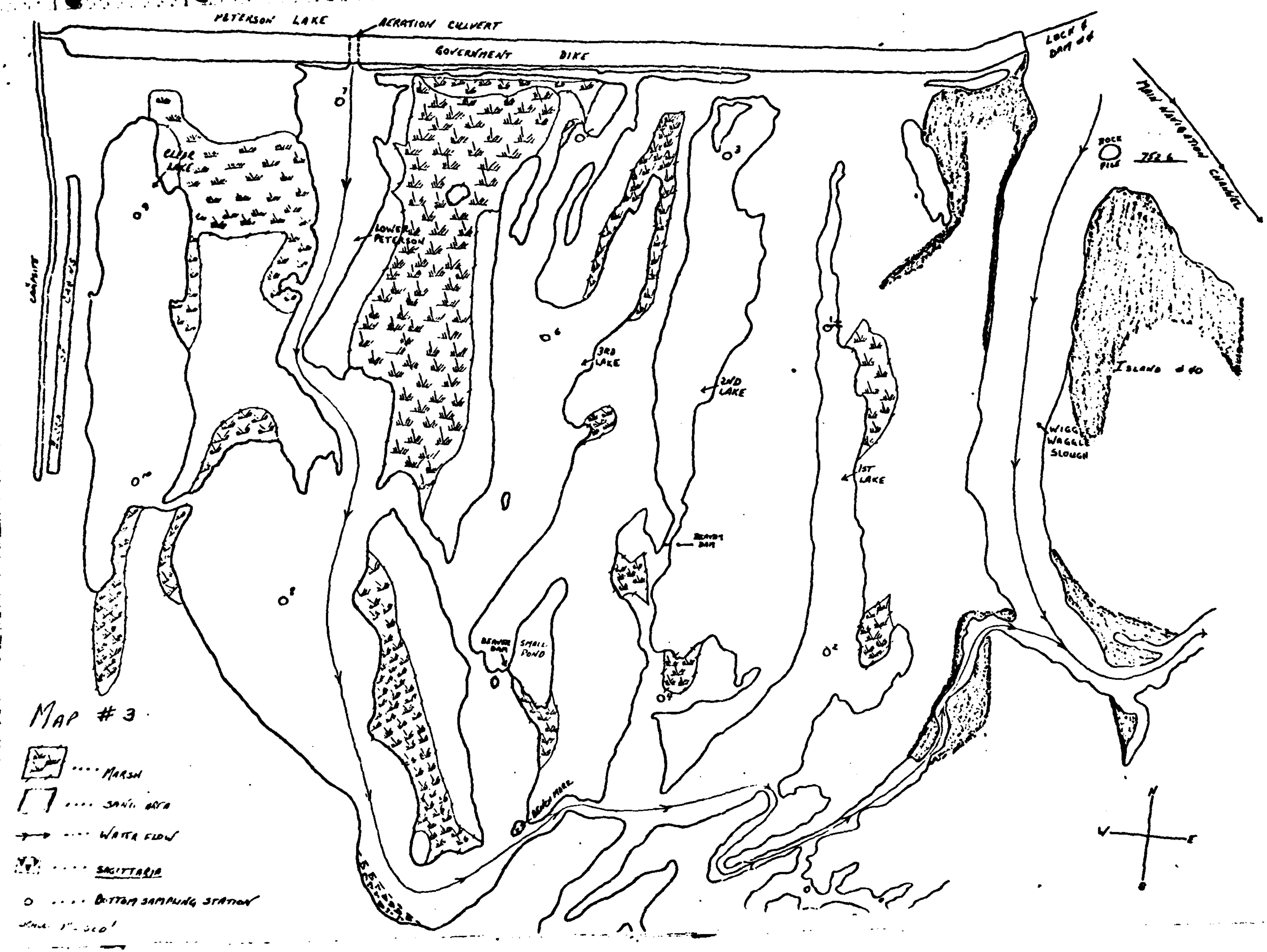
+ sample taken before the culvert was installed

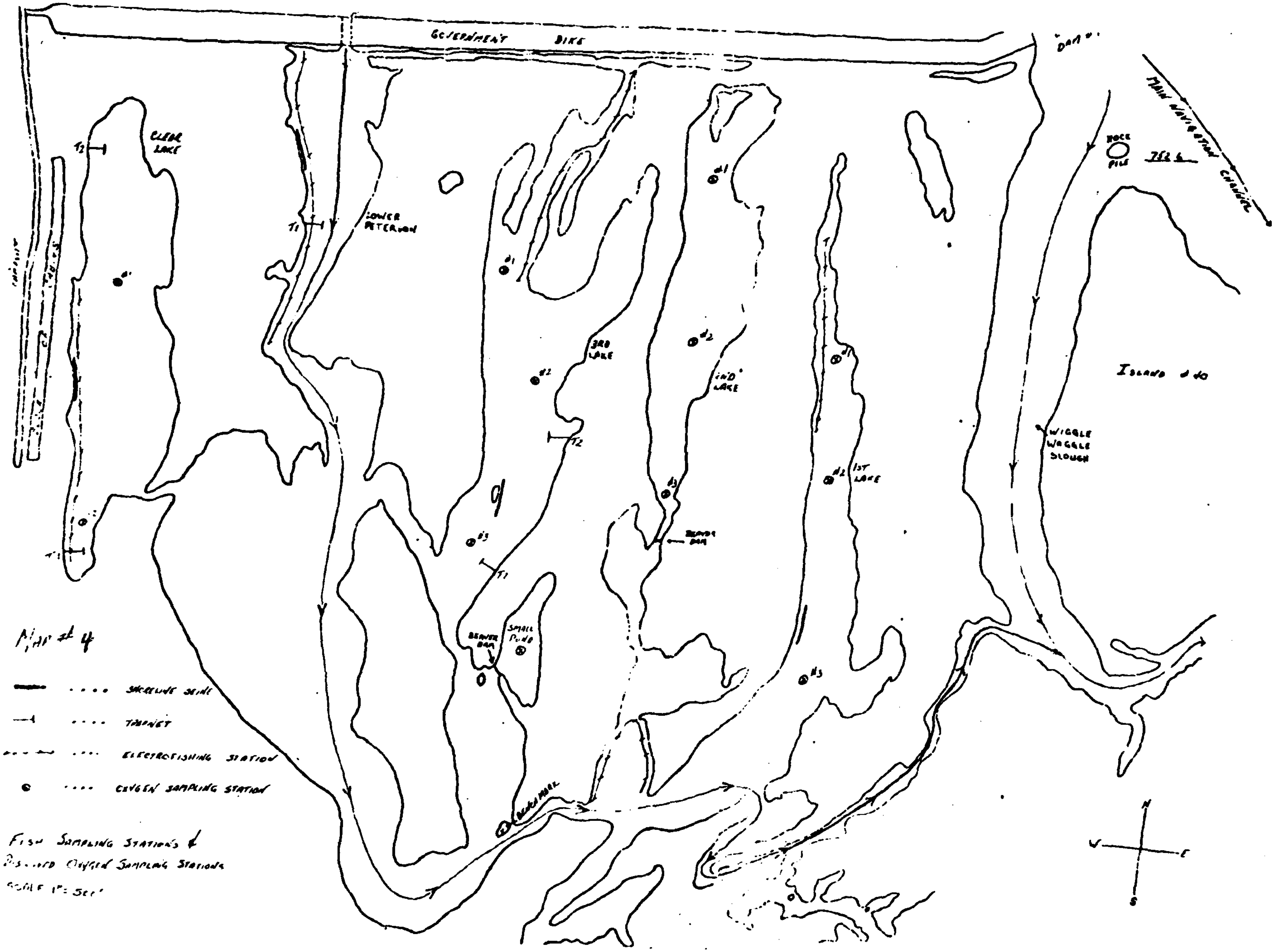
* known winter-kill area

** no previous data


PETERSON LAKE
AERATION CULVERT
GOVERNMENT DIKE
LOCK & DAM #4
MAIN NAVIGATION CHANNEL
ROCK PILE
CLEAR LAKE
LOWER PETERSON
3RD LAKE
2ND LAKE
ISLAND #10
WIGGLE WAGGLE SLOUGH
1ST LAKE
BEAVER DAM
SMALL POND
MAP #1
.... LAKE BOUNDRIES
...... HIGH WATER FLOW PATTERN
SCALE: 1" = 500'
N
E


PETERSON LAKE
AERATION CULVERT
GOVERNMENT DIKE
LOCK & DAM #4
MAIN NAVIGATION CHANNEL
ROCK PILE
CLEAR LAKE
LOWER PETERSON
3RD LAKE
2ND LAKE
1ST LAKE
BEAVER DAM
SMALL POND
WIGGLE WAGGLE SLOUGH
MAP # 2
WATER DEPTHS IN FEET
<1' ... SHADED AREA REPRESENTS LESS THAN 1 FOOT DEPTH
SCALE: 1" = 500'
N
S
E
W


PETERSON LAKE
AERATION CULVERT
GOVERNMENT DIKE
LOCK & DAM #4
MAIN NAVIGATION CHANNEL
ROCK PILE
CLEAR LAKE
LOWER PETERSON
3RD LAKE
2ND LAKE
1ST LAKE
BEAVER DAM
SMALL POND
ISLAND #40
WIGGLE WAGGLE SLOUGH
N
W
E
S
Map #3
.... MARSH
.... SAND AREA
.... WATER FLOW
.... SAGITTARIA
.... BOTTOM SAMPLING STATION


GOVERNMENT DIKE
MAIN NAVIGATION CHANNEL
ROCK PILE
DAM
ISLAND #40
WIGGLE WAGGLE SLOUGH
CLEAR LAKE
LOWER PETERSON
3RD LAKE
2ND LAKE
1ST LAKE
BEAVER DAM
SMALL POND
T1
T2
Map # 4
.... SHORELINE SEINE
.... TRAPNET
.... ELECTROFISHING STATION
.... OXYGEN SAMPLING STATION
Fish Sampling Stations &
Dissolved Oxygen Sampling Stations
N
S
E
W

APPENDIX N

NEWS RELEASE ASKING FOR PUBLIC SUGGESTIONS FOR SIDE CHANNEL PROJECTS

GREAT

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725-4690

U.S. Fish & Wildlife Service, 538 Federal Bldg.,
316 N. Robert St., St. Paul, MN 55101 Telephone 612-725-7131

October 3, 1978

NEWS RELEASE

GREAT SEEKS RIVER SIDE CHANNEL RECOMMENDATIONS

The Fish and Wildlife Work Group (FWWG) of the Great River Environmental Action Team (GREAT) is asking for public suggestions for opening or altering side channels on the Mississippi River from Minneapolis to Guttenberg, Iowa. The suggested alterations will be evaluated on-site by the Fish and Wildlife Work Group and included in a comprehensive list which will be given to the GREAT and the U.S. Army Corps of Engineers as part of the work group's final report. If the GREAT final report and recommendations are accepted by the U.S. Congress, the Corps will be granted authority to alter these side channels as part of their normal river management program.

Those interested in making suggestions for the GREAT's side channel recommendations should send the following information to either Michael Vanderford, chairman of the Fish and Wildlife Work Group, or Dan McGuiness, public participation coordinator for GREAT:

1) a map of the side channel which needs work and the surrounding area;
2) a description of what needs to be done at the side channel;
3) a description of who or what would benefit from the project;

and, 4) if the suggestion is to open a side channel, include a suggestion for where the spoil from the project should be put.

The suggestions are needed by the Fish and Wildlife Work Group by October 23, 1978 in order that they can all be inspected before ice-out. Mr. Vanderford's address is : U.S. Fish and Wildlife Service, 538 Federal Courts Building, St. Paul, MN 55101. Mr. McGuiness's address is: GREAT, Public Participation Coordinator, 149 West Main Street, Wabasha, MN 55981.

Public input has played a major role in the four year program of GREAT and the Team is attempting to make sure that all major side channel problems are identified by again asking for public input. The Team is interested in both biological problems and recreational problems associated with side channel blockages. The GREAT has emphasized that all suggestions and comments will be seriously considered and investigated.

GREAT CONTINUES MISSISSIPPI BACKWATER IMPROVEMENTS - The Great River Environmental Action Team (GREAT) is continuing its efforts to improve backwater areas of the Mississippi River through side channel modification projects such as this one accomplished at the junction of the Mississippi and Minnesota River in 1976. The GREAT is preparing its final report for the U.S. Congress and the U.S. Army Corps of Engineers and is asking the public for suggestions for additional side channel projects that could be included in the report. The Team is attempting to obtain authority for the Corps of Engineers to make such work part of the 9-foot channel maintenance project.

Cedar Rapids, Iowa

Great I Asks Suggestions About Mississippi Side Channels

If Press readers know of a Mississippi River side channel they believe ought to be opened or altered, the Great I Fish and Wildlife work group would appreciate hearing from them.

The fish and wildlife group of Great River Environmental Action Team is asking for public suggestions for opening or altering side channels on the river from Guttenberg to Minneapolis. Those suggested will be evaluated on-site, says a Great I release, and included in a comprehensive list which will become part of the work group's final report.

If the Great I final report and recommendations are accepted by the Congress, the news release continues, the U.S. Army Corps of Engineers will be granted authority to alter the designated side channels as part of its regular channel maintenance program.

Suggestions should be sent to: Michael Vanderford, U.S. Fish and Wildlife Service, 538 Federal Courts Building, St. Paul, Minn. 55101; or to Dan McGuiness, 149 West Main, Wabasha, Minn. 55981.

The suggestions are needed by October 23 and should include this information: map of side channel needing work and the surrounding area; description of what needs to be done at the side channel; description of who or what would benefit from the project; suggestion on where to put dredge spoil the project might produce.

Great I says that public suggestions and ideas have played a major role in its four-year program, and is trying to make sure all major side channel problems are identified by again asking public help. It notes that Great I is interested in both biological and recreational problems associated with blocked side channels, and emphasizes that all suggestions and comments will be seriously considered and investigated.

Allamakee Journal

Wednesday, October 11, 1978

River Side Channel Changes Sought

The Fish and Wildlife Work Group (FWWG) of the Great River Environmental Action Team (GREAT) is asking for public suggestions for opening or altering side channels on the Mississippi River from Minneapolis to Guttenberg, Iowa. The suggested alterations will be evaluated on site by the Fish and Wildlife Work Group and included in a comprehensive list which will be given to the GREAT and the U.S. Army Corps of Engineers as part of the work group's final report. If the GREAT final report and recommendations are accepted by the U.S. Congress, the Corps will be granted authority to alter these side channels as part of their normal river management program.

Those interested in making suggestions for the GREAT's side channel recommendations should send the following information to either Michael Vanderford, Chairman of the Fish and Wildlife Work Group, or Dan McGuiness, Public Participation Coordinator for GREAT:

1. A map of the side channel which needs work and the surrounding area; 2. a description of what needs to be done at the side channel; 3. a description of who or what would benefit from the project; 4. and if the suggestion is to open a side channel, include a suggestion for where the spoil from the project should be put.

The suggestions are needed by the Fish and Wildlife Work Group by October 23, 1978 in order that they can all be inspected before ice-out. Mr. Vanderford's address is: U.S. Fish and Wildlife Service, 538 Federal Courts Building, St. Paul, MN 55101. Mr. McGuiness's address is: GREAT, Public Participation Coordinator, 149 West Main Street, Wabasha, MN 55981.

Public input has played a major role in the four year program of GREAT and the Team is attempting to make sure that all major side channel problems are identified by again asking for public input. The Team is interested in both biological problems and recreational problems associated with side channel blockages. The GREAT has emphasized that all suggestions and comments will be seriously considered and investigated.

APPENDIX O

OUTLINE OF WEAVER REHABILITATION STAGES IN

PROPOSAL APPROVING THE FIRST STAGE

GREAT

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA 55111 • PHONE: 612-725-4690

April 26, 1977

GREAT

Side Channel Work Group

- Proposal Background -
For
Phase I Study of the Weaver-Belvidere Area
Upper Mississippi River

Objective

To obtain sufficient baseline data and engineering analysis of the Weaver Bottoms and Belvidere Slough area (see attached map) to make a decision on a restorative measures pilot proposed for the Weaver Bottoms.

WHERE

The proposed study pilot will take place in the Weaver-Belvidere area. The information obtained will be applied throughout the Upper Mississippi River.

WHEN

Phase I

The background data collection and analysis will be accomplished in June, July, and August of 1977. This will constitute Phase I of the over-all rehabilitation pilot. Information will be provided informally to the Team as it becomes available. A formal report will be provided by January 15, 1978.

Phase II

(Not included in present proposal)

Restorative measures will be attempted at the Weaver Bottoms if and when the Phase I work substantiates the probable benefit of the measures and the COE has satisfactorily completed the NEPA process. This might be as soon as the fall of 1977.

Phase III

(Not included in present proposal)

Monitoring will be conducted to determine the actual effects of the restorative measures attempted.

WHO

The SCWG has recommended that Winona State University be assigned to accomplish these objectives, contingent upon St. Mary's College and Colorado State University subcontract agreements (see Winona State proposal).

HOW MUCH

The recommended proposal has a budget of $60,161.44.

Note: The potential contractors have requested special consideration by the GREAT for restoring several items to the proposal which the SCWG cut. The additional items will raise the budget officially to $76,276.74. The actual budget may be substantially less, however.

MINORITY REPORT

Unanimous vote. No minority opinion.

Michael J. Vanderford
Michael J. Vanderford
Chairman, Side Channel Work Group

$67,000.00 approved by GREAT

APPENDIX P

PREDICTED FLOOD STAGE IMPACTS OF THE

PROPOSED PHASE II OF THE WEAVER BOTTOMS REHABILITATION

COLORADO STATE UNIVERSITY

FORT COLLINS, COLORADO 80523

Phone: 303-491-8655

ENGINEERING RESEARCH CENTER, FOOTHILLS CAMPUS

Cable Code: ENGRCSU

OFFICE OF THE DEAN

March 26, 1979

Mr. Michael J. Vanderford
U.S. Fish and Wildlife Services
Division of Ecological Services
St. Paul Field Office
538 Federal Building & U.S. Court House
316 North Robert Street
St. Paul, Minnesota 55101

Dear Mike:

Please forgive us for delaying our response to reassess the effects of closing the openings between the Mississippi River main stem and Weaver Bottoms on flood stages. Because the original computer program utilized for routing water and sediment in the Mississippi River - Weaver Bottoms - Belvidere Slough area has been purged, it would require considerable effort to restore the mathematical model. However, we understand that this reassessment is quite urgent and important. In response to your phone request of March 19, 1979, we then spent three days and about $200 computer charges in restoring the mathematical model of the study area and reassessing the effects of closing cuts on the flood stages.

As described in the report "Hydrological Study of the Weaver-Belvidere Area, Upper Mississippi River," two alternatives were studied (see Fig. 1):

(1) Alternative 1 - Close Inlets MN4, MN5, MN11, MN12, and MN13 and stabilize the other inlets.

(2) Alternative 2 - Close Inlets MN4, MN5, MN11, MN12, and MN13, modify Inlets MN3, MN6 and MN10, and stabilize Inlet MN7.

In our original assessment of effects of these alternatives on the flood stages and discharge distributions, it was assumed that once the cuts were closed there would be no flow through the cuts. However, it was later found that the elevations of islands separating the Mississippi main stem from Weaver Bottoms are in general, lower than 666 ft (m.s.l.). Water would overflow the closed cuts if the stage was higher than 666 ft. Therefore, the discharge increase in the Mississippi main stem and in the Belvidere area due to closures of inlets assessed in the original report, are too large. This resulted in an overestimate of the corresponding increase in flood stages.

In the revised mathematical model, the discharge - stage relations through the closed inlets are modified to consider the water overflow to Weaver Bottoms when the stages are higher than 666 ft. Also, the downstream boundary section is moved 1 mile downstream to below the outlet of Weaver Bottoms. The newly computed results are shown in Figs. 2-5. As expected, the discharge increases in the Mississippi main stem and in Belvidere area are less than that estimated in the original report (see Figs. 3 and 4). This in turn reduces the effects of the cut closures on the flood stages. The maximum increase in stages would occur at about bankfull stages. The estimated maximum increases are 0.3 ft. and 0.6 ft for Alternatives 1 and 2, respectively. Once the flow goes overbank, the effects decrease as shown in Fig. 5.

Because time is limited, only the water routing is considered in the revised mathematical model. The changes in discharge distributions and stages in the study area would affect the sediment transport accordingly. However, it is expected that the effects of cut closures on the sediment transport assessed in the original report should be at least qualitatively correct. As a matter of fact, the effects should be less than that given in the original report.

We hope that this new information is of value to you. Since the mathematical model has been essentially reconstructed, it can be used to study other problems in this area. If you need additional information, please contact us.

Sincerely yours,

D. B. Simons

D. B. Simons, Associate Dean
College of Engineering
Professor of Civil Engineeering

Y. H. Chen

Y. H. Chen
Assistant Professor of
Civil Engineering

DBS/YHC/mr

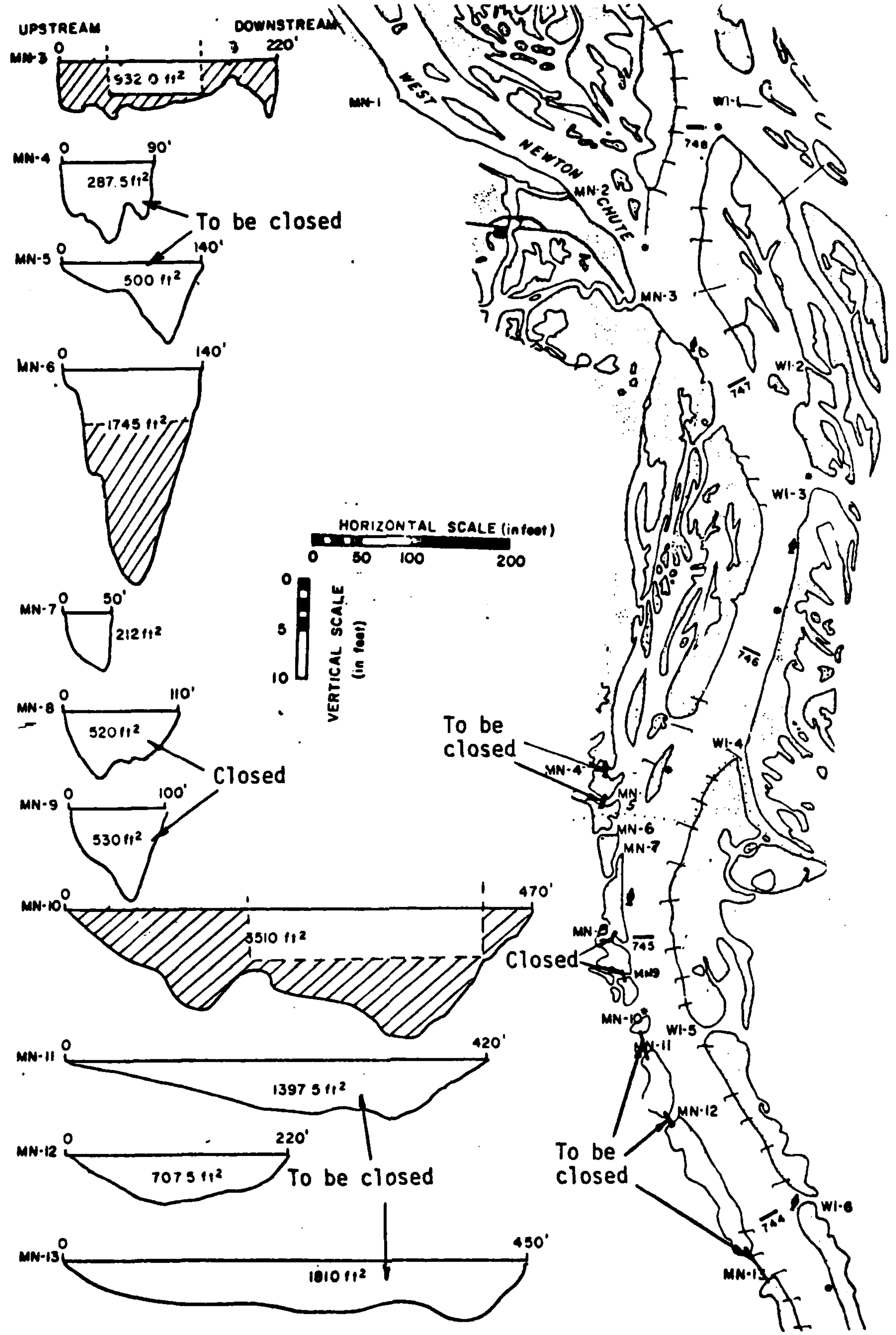


Fig. 1. Modification of Weaver Bottoms Inlets

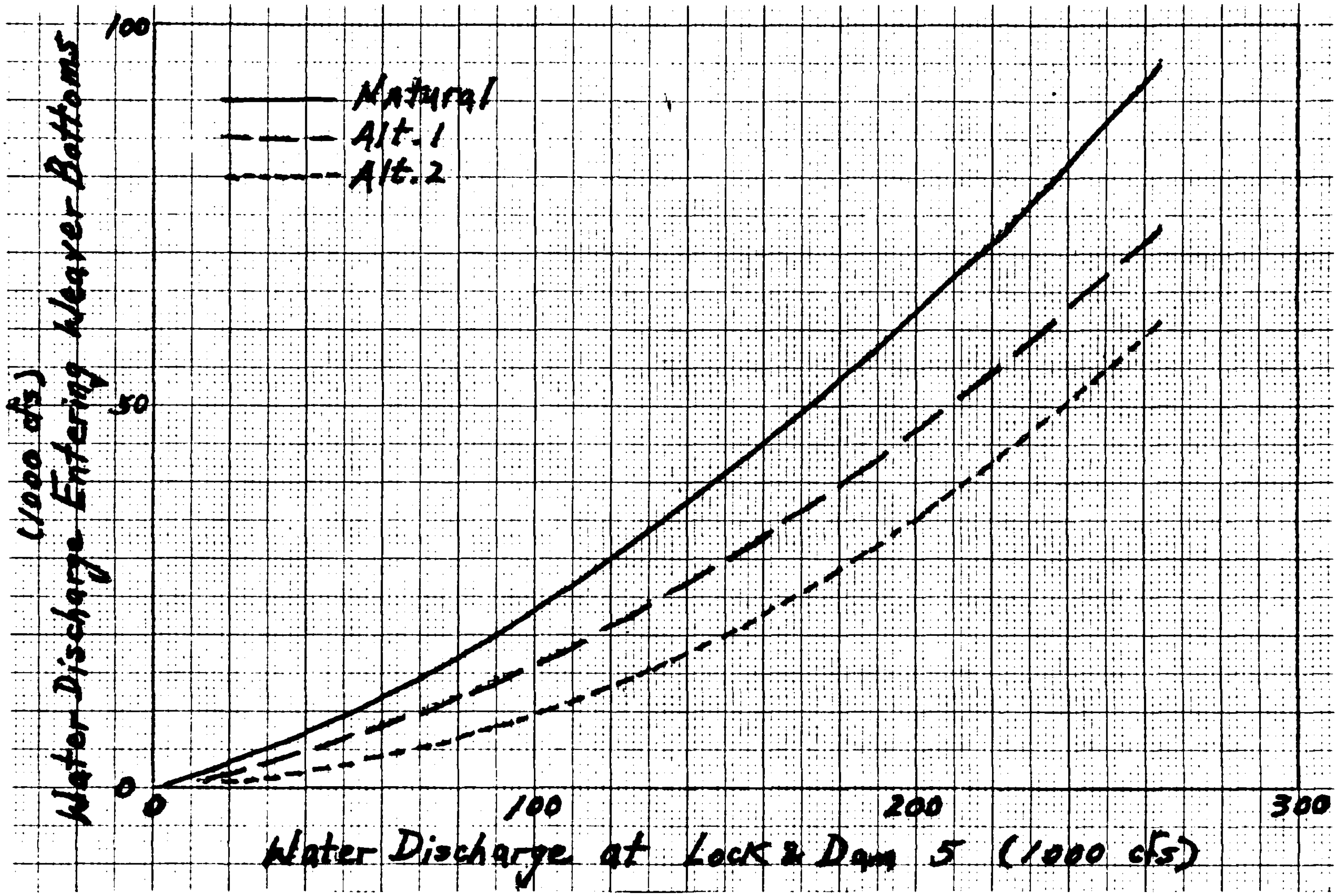


Fig. 2. Water Discharge Entering Weaver Bottoms

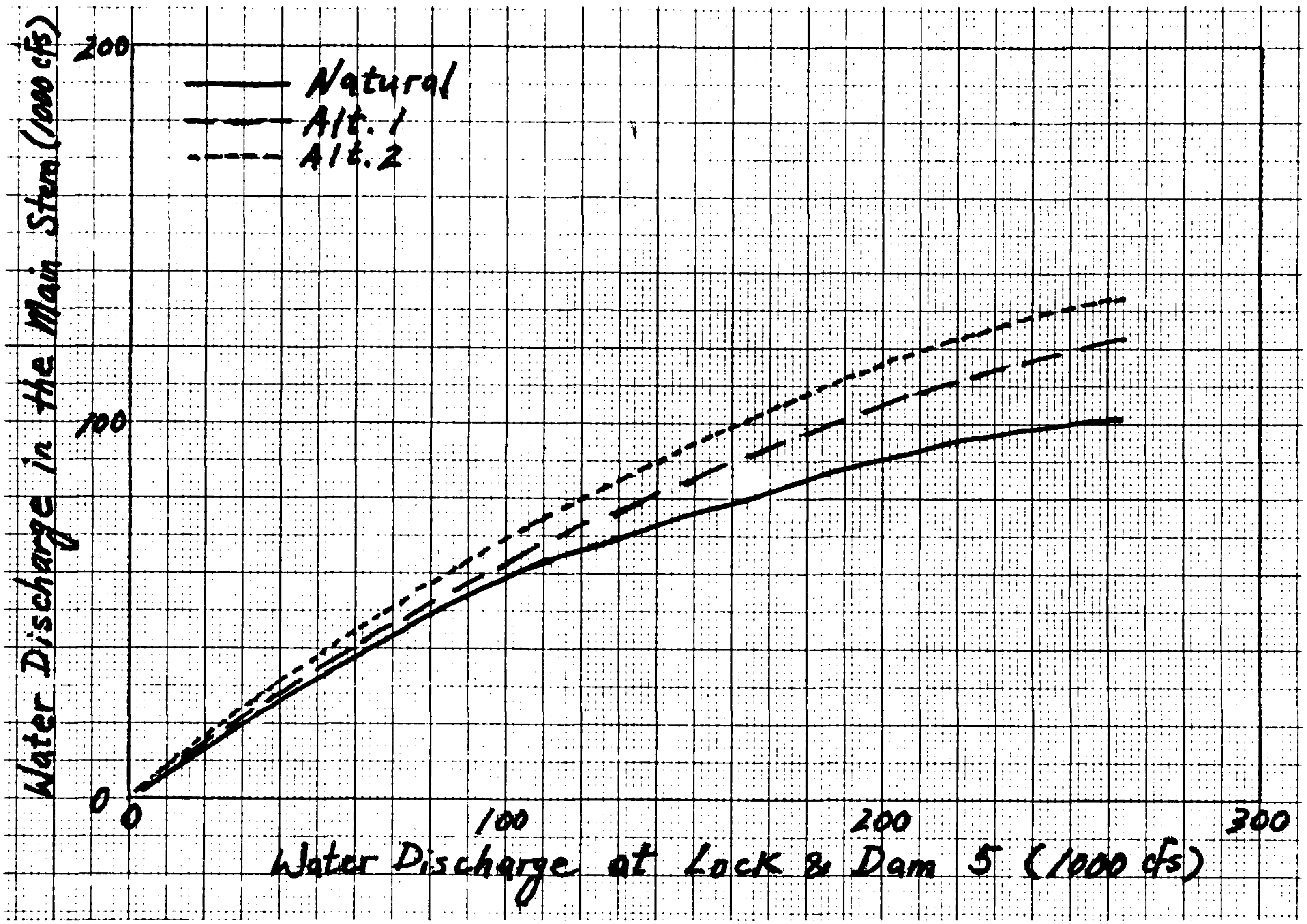


Fig. 3. Water Discharge in the Mississippi River Main Stem adjacent to the Weaver-Belvidere Area

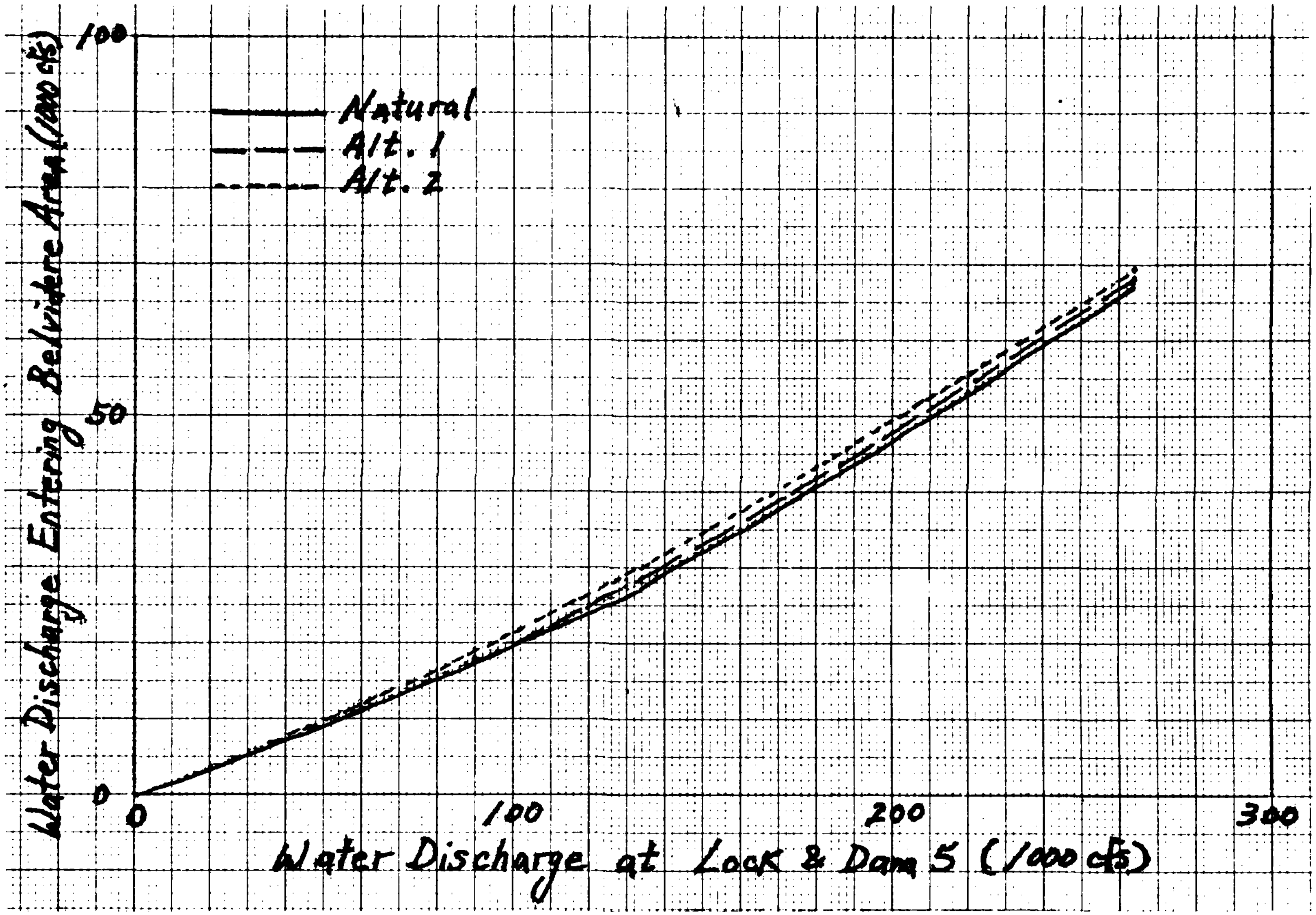


Fig. 4. Water Discharge Entering the Belvidere Area

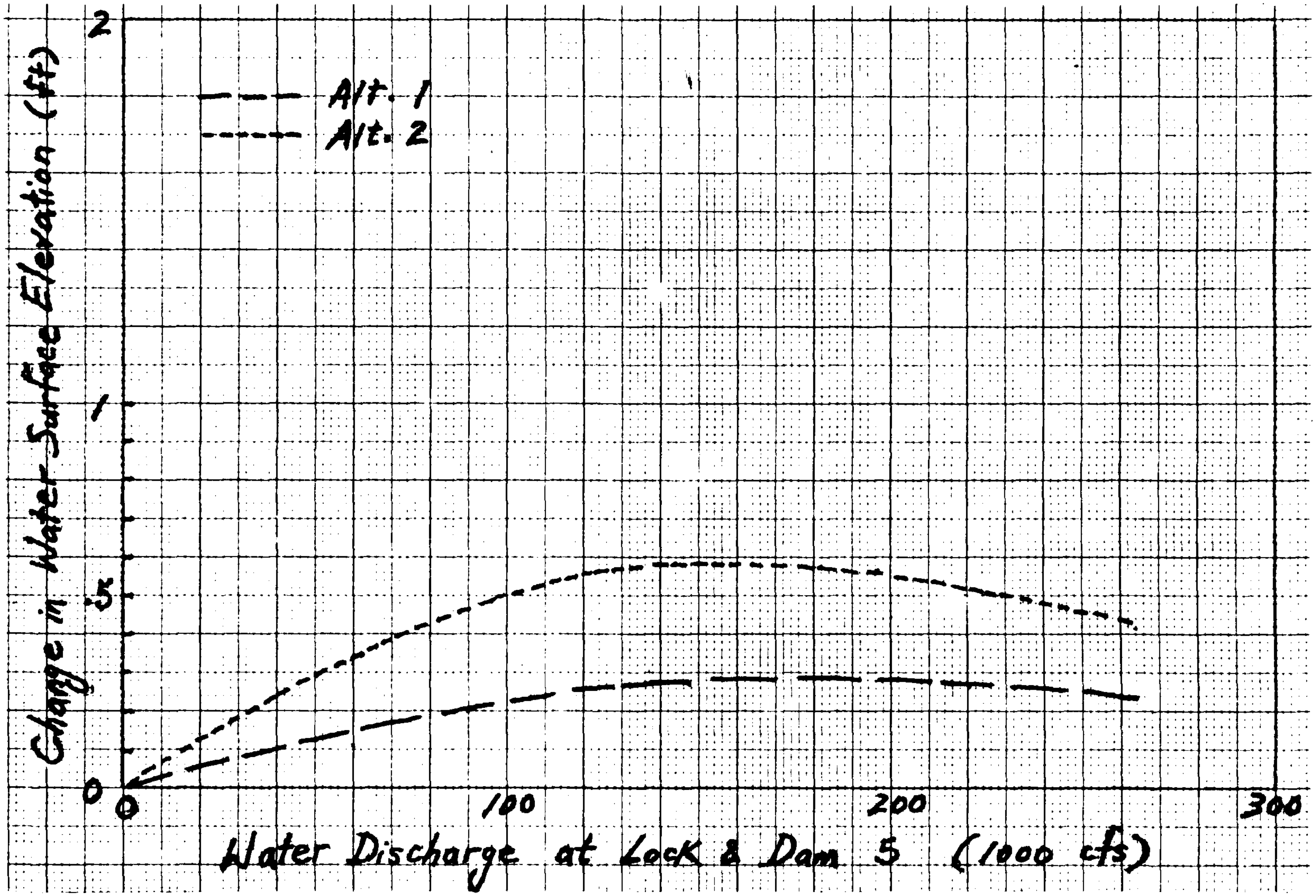


Fig. 5. Increase in Stage Due to Modifications of Weaver Bottoms Inlets

APPENDIX P1

CALCULATED FLOODSTAGE IMPACTS

OF THE WEAVER BOTTOMS REHABILITATION PROJECT

JUNE 1980

have any questions or ... additional ... please call me. Y. H. Chen

IMPACTS ON FLOOD STAGES DUE TO SIDE CHANNEL MODIFICATIONS IN THE WEAVER-BELVIDERE AREA, UPPER MISSISSIPPI RIVER

By D. B. Simons and Y. H. Chen

INTRODUCTATION

6/15/80

The GREAT I (the Great River Environmental Action Team) is recommending that modifications identified in the Phase I Study of the Weaver-Belvidere Area, Upper Mississippi River (Page 11-5 through 11-7, Nielsen, et. al., 1978) be implemented using dredged material as the core material for the side channel modifications. The recommended modifications are (see Fig. 1):

1. Construct notched closing dams in Side Channels MN3, MN6, and MN10. Their heights should be no more than 3 to 4 ft above normal pool level (660 ft, msl). Side Channel MN7 should have its banks stabilized with riprap.

2. Block Side Channels MN4 and MN5 with closing dams formed of riprap. The heights of dams should be no more than 2 to 3 ft above normal pool level.

3. Fill Side Channels MN11, MN12, and MN13 with dredged sand to a height of about 12 ft above normal pool level.

4. Unplug the upper end of Old John's Ditch to allow water to flow from West Newton Chute into Half-Moon Lake.

The objective of this study was to determine the flood stage impacts at the three specified areas: (1) the Wisconsin shore at Spring Lake (R.M. 741-742L), (2) the Minnesota shore at the West Newton Colony (R.M. 747-748R), and (3) the Wisconsin shore at the City of Alma (R.M. 752L).

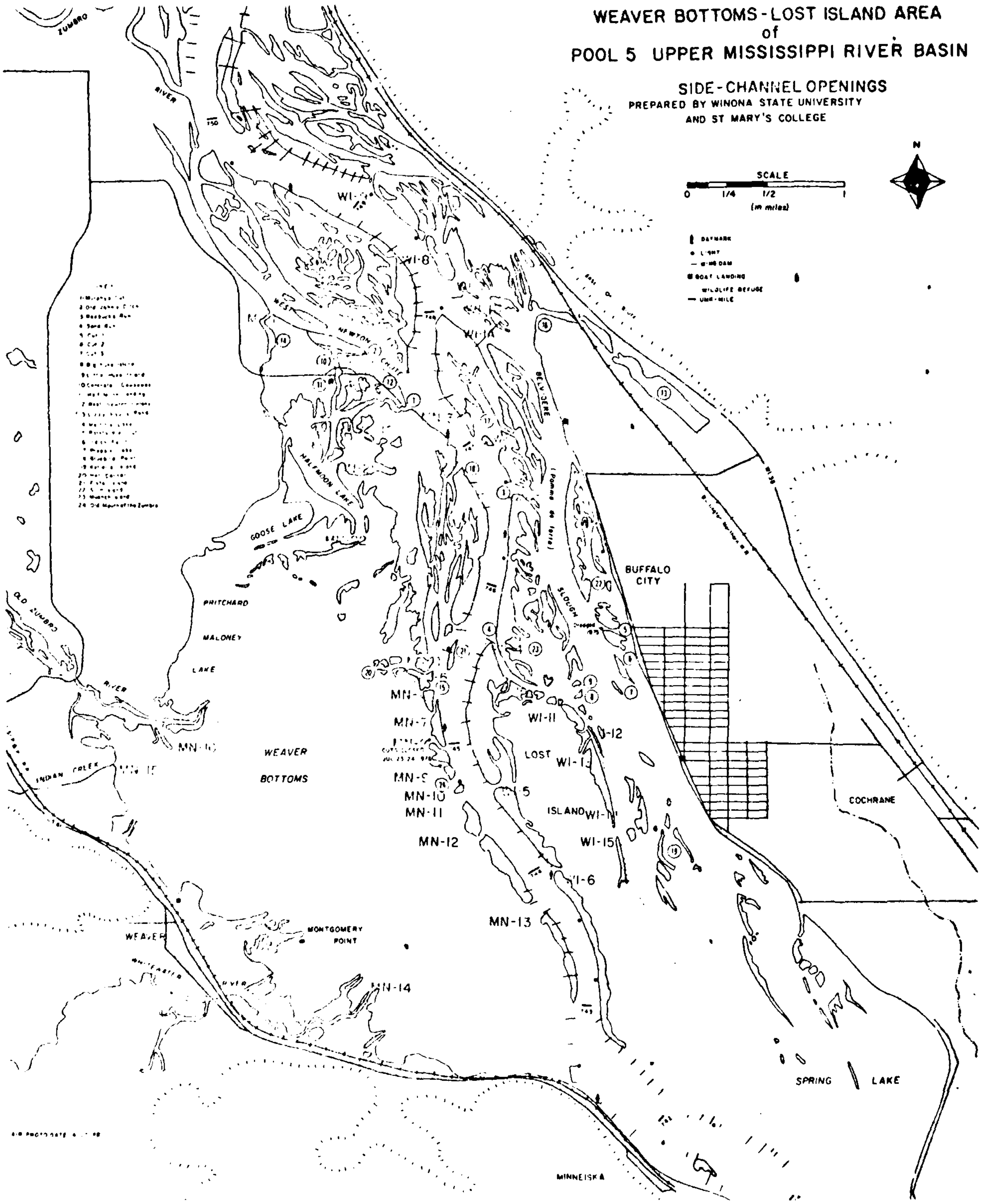


Fig. 1 Side-Channel Openings, Weaver Bottoms-Belvidere Slough Area

METHOD OF ANALYSIS

A mathematical model was developed by Simons and Chen (1977) to perform a hydrological study of the Weaver-Belvidere Area. This model was combined with the model developed by Simons, et. al. (1980) to extend the study reach to cover the entire Pool 5. The model is based on the water continuity equation and the dynamic equation that describe the conservations of mass and momentum respectively. The channel characteristics of Pool 5 were represented by 20 computational cross sections as shown in Fig. 2. The locations of these cross sections are given in Table 1. The value of Manning's roughness coefficient utilized in the model downstream of River Mile 748.6 was 0.019 when the discharge was less than 90,000 cfs and was 0.016 when the discharge was greater than 130,000 cfs. For discharge between 90,000 and 130,000 cfs, the value of Manning's n varied with discharge as a power function. For the reach upstream of River Mile 748.6, a slightly larger Manning's n was used.

The lateral flow exchanges among the Mississippi main Channel, Weaver Bottoms and Belvidere Slough were computed utilizing the relation

$$Q_L = a + bH + cH^2 \tag{1}$$

where H is the water surface elevation in the main channel in ft, msl, Q_L is the lateral outflow discharge in cfs, and a, b and c are coefficients determined by using field data and hydraulic theories. The values of a, b and c for the natural conditions are given in Table 2 for each side channel. Also the locations of side channels in reaches formed by the neighboring cross sections are given. This combined model provides a better control on the backwater effects of Lock and Dam 5 and flow balance, and computes the flood stages in the entire Pool 5 including all the sites specified earlier. The model reproduced the 1965 stage hydrograph at Alma (R.M. 752.6) fairly well.

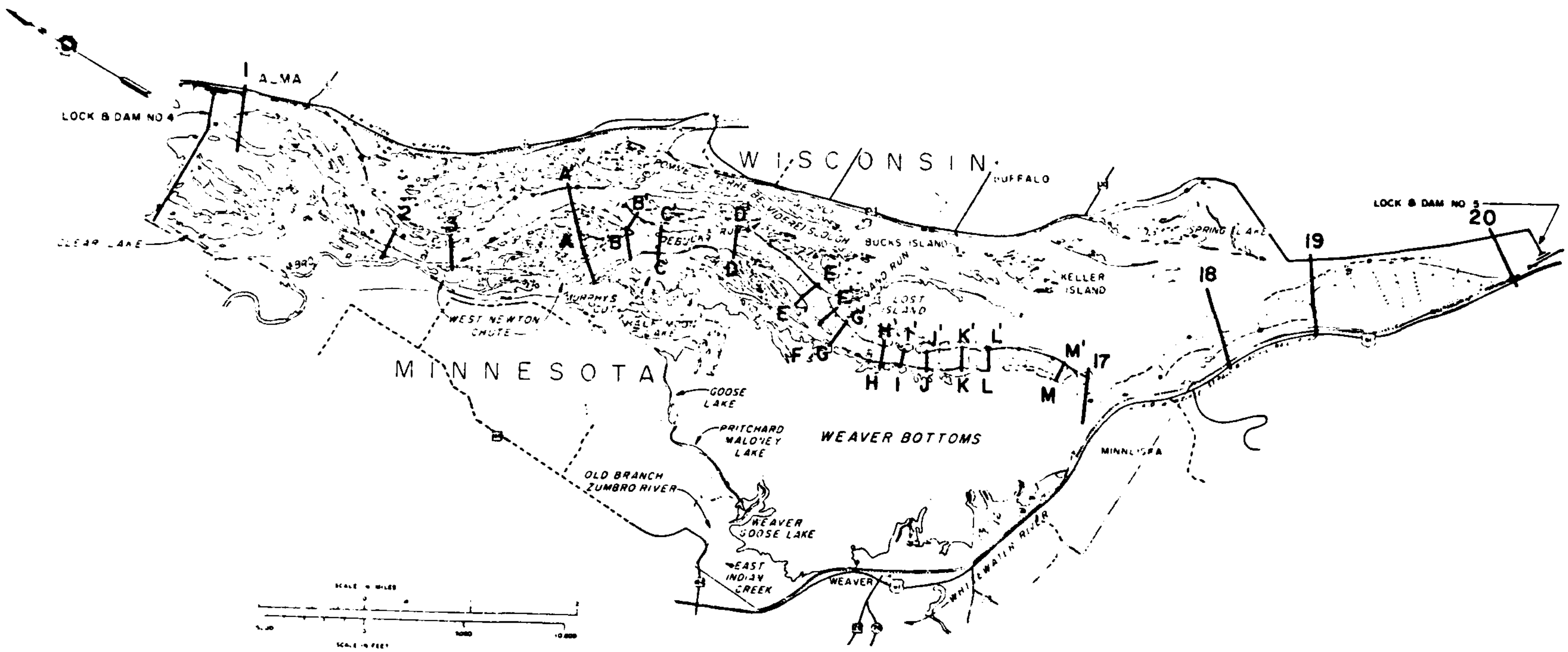


Fig. 2 Computational Cross Sections of the Pool 5 Mathematical Model, Upper Mississippi River

TABLE 1 Locations of Computational Cross Sections for the Mathematical Model of Pool 5

Cross Section Name	River Mile
1	752.6
2	750.6
3	749.6
A-A' (4)	748.6
B-B' (5)	747.8
C-C' (6)	747.4
D-D' (7)	746.7
E-E' (8)	745.7
F-F' (9)	745.6
G-G' (10)	745.3
H-H' (11)	744.9
I-I' (12)	744.8
J-J' (13)	744.5
K-K' (14)	744.1
L-L' (15)	743.9
M-M' (16)	743.0
17	742.6
18	741.4
19	740.0
20	738.3

TABLE 2 Lateral Outflow Relations $Q_L = a + bH + cH^2$ for the Natural Conditions

Side Channel	Reach	a	b	c
MN1	4-5	-1,145,090	3,385.00	-2.5000
MN2	4-5	-1,145,090	3,385.00	-2.5000
MN3	6-7	5,443,049	-17,555.60	14.1045
MN4	9-10	19,209,640	-58,504.14	44.5445
MN5	9-10	12,406,349	-38,035.16	29.1485
MN6	9-10	-1,622,396	3,452.22	-1.5041
MN7	10-11	21,894,534	-66,361.86	50.2858
MN8	10-11	- 0 -	- 0 -	- 0 -
MN9	11-12	- 0 -	- 0 -	- 0 -
MN10	11-12	65,308,000	-197,950.00	150.0000
MN11	12-13	61,840,785	-187,252.75	141.7500
MN12	13-14	9,071,042	-27,684.57	21.1229
MN13	15-16	60,213,500	-182,531.67	138.3333
WI1	4-5	39,652,712	-121,238.00	92.6667
WI2	6-7	3,414,936	-10,454.00	8.0000
WI3	7-8	12,790,400	-39,541.67	30.5556
WI4	8-9	8,177,030	-25,094.00	19.2500
WI5	12-13	12,087,298	-36,670.00	27.8125
WI6	14-15	13,717,656	-42,027.50	32.1875
WI7	4-5	11,108,132	-33,742.50	25.6250
WI8	4-5	1,854,747	-5,697.50	4.3750
WI9	3-4	4,703,486	-14,345.00	10.9375

Modifications of Side Channels MN3, MN4, MN5, MN6, MN10, MN11, MN12, and MN13 would affect the lateral flow relations at these side channels. The modified relations are given in Table 3. These relations were derived based on the following assumptions:

1. Water would overtop the closing dams at MN3, MN6 and MN10 at stage 660 ft.

2. Water would overtop the closing dams at MN4 and MN5 at stage 662 ft.

3. Water would be blocked by the closing dams at MN11, MN12 and MN13.

The lateral flow relations thus derived should calculate lateral flow discharges overflowing the modified side channels with reasonable accuracy. The lateral flow relations given in Tables 2 and 3 can be verified of improved if additional high flow data are available.

TABLE 3 Lateral Outflow Relations $Q_L = a + bH + cH^2$ for the Modified Side Channels

Side Channel	a	b	c
MN3	24,589,400	-74,656.67	56.6667
MN4	24,614,920	-74,475.33	56.3333
MN5	16,349,630	-49,467.17	37.4167
MN6	15,824,160	-48,066.00	36.5000
MN10	63,341,520	-192,002.00	145.5000
MN11	- 0 -	- 0 -	- 0 -
MN12	- 0 -	- 0 -	- 0 -
MN13	- 0 -	- 0 -	- 0 -

STUDY RESULTS

Figures 3, 4 and 5 show the computed discharges entering Weaver Bottoms from the Mississippi River main channel, the discharges in the Mississippi main channel adjacent to the Weaver-Belvidere area, and the discharges entering Belvidere Slough from the Mississippi main channel, respectively, for a range of flow conditions. As shown in the figures, modifications (or closures) of Side Channels MN3, MN4, MN5, MN6, MN10, MN11, MN12 and MN13 would reduce flow discharges entering Weaver Bottoms from the Mississippi main channel and thereby increase flow discharges in the main channel and the discharges entering the Belvidere area. This would in turn increase flood stages in these areas as given in Table 4. For a one-hundred year flood (Q = 245,000 cfs, based on the Upper Mississippi River Comprehensive Basin Study, 1970), the increase in flood stage due to side channel modifications would be 0.1 ft at Spring Lake (R.M. 741-742L), 0.6 ft at the West Newton Colony (R.M. 747-748R), and 0.5 ft at Alma (R.M. 752L).

TABLE 4 Flood Stage Increases Due to Side Channel Modifications

Total Discharges (cfs)	River Mile			
	752.6	747.8	744.5	741.4
60,000	0.2	0.3	0.3	0.0
90,000	0.3	0.4	0.4	0.0
130,000	0.4	0.5	0.5	0.0
180,000	0.4	0.5	0.6	0.1
220,000	0.5	0.6	0.6	0.1
264,000	0.5	0.6	0.7	0.1

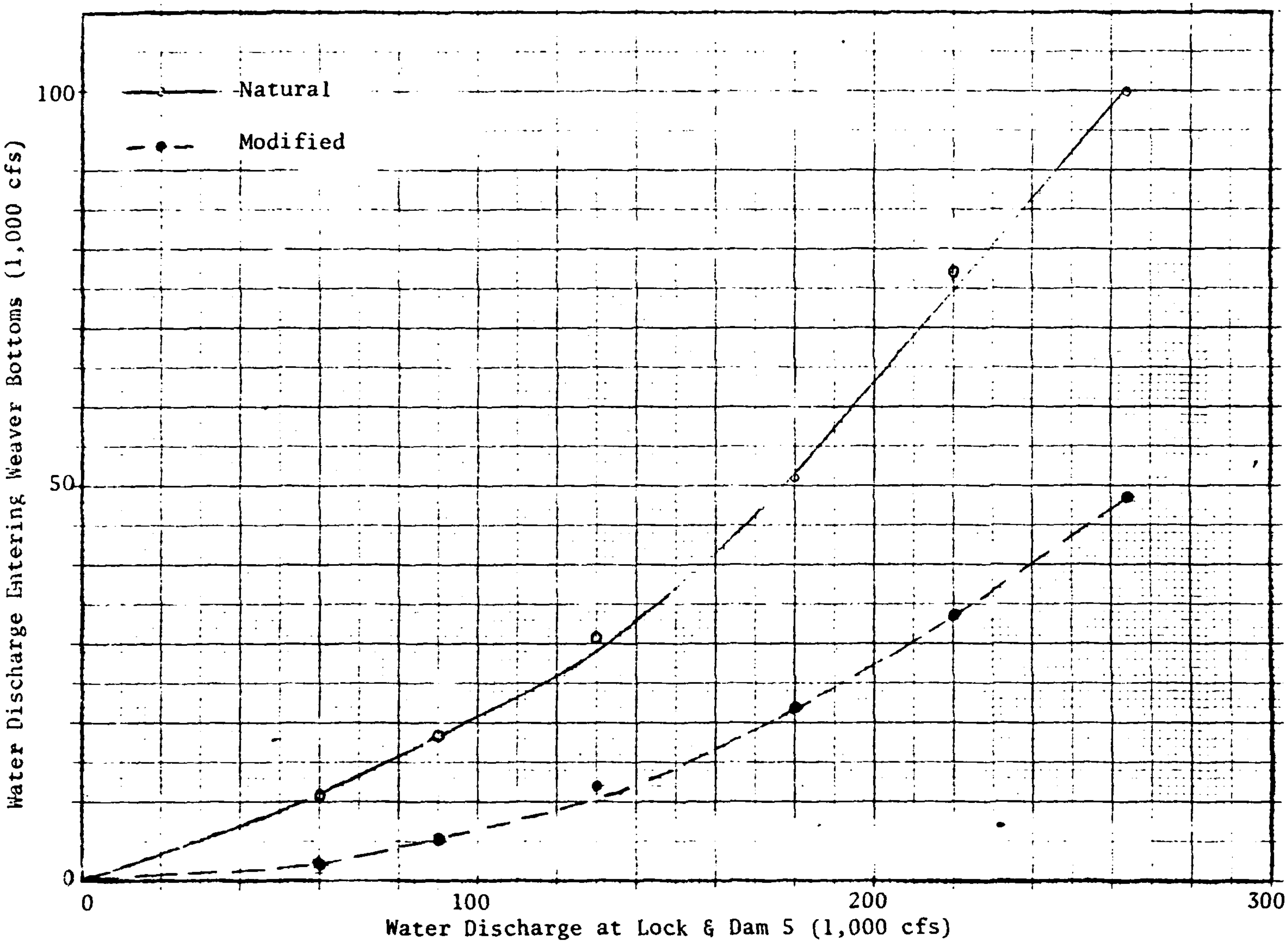


Fig. 3 Water Discharge Entering Weaver Bottoms

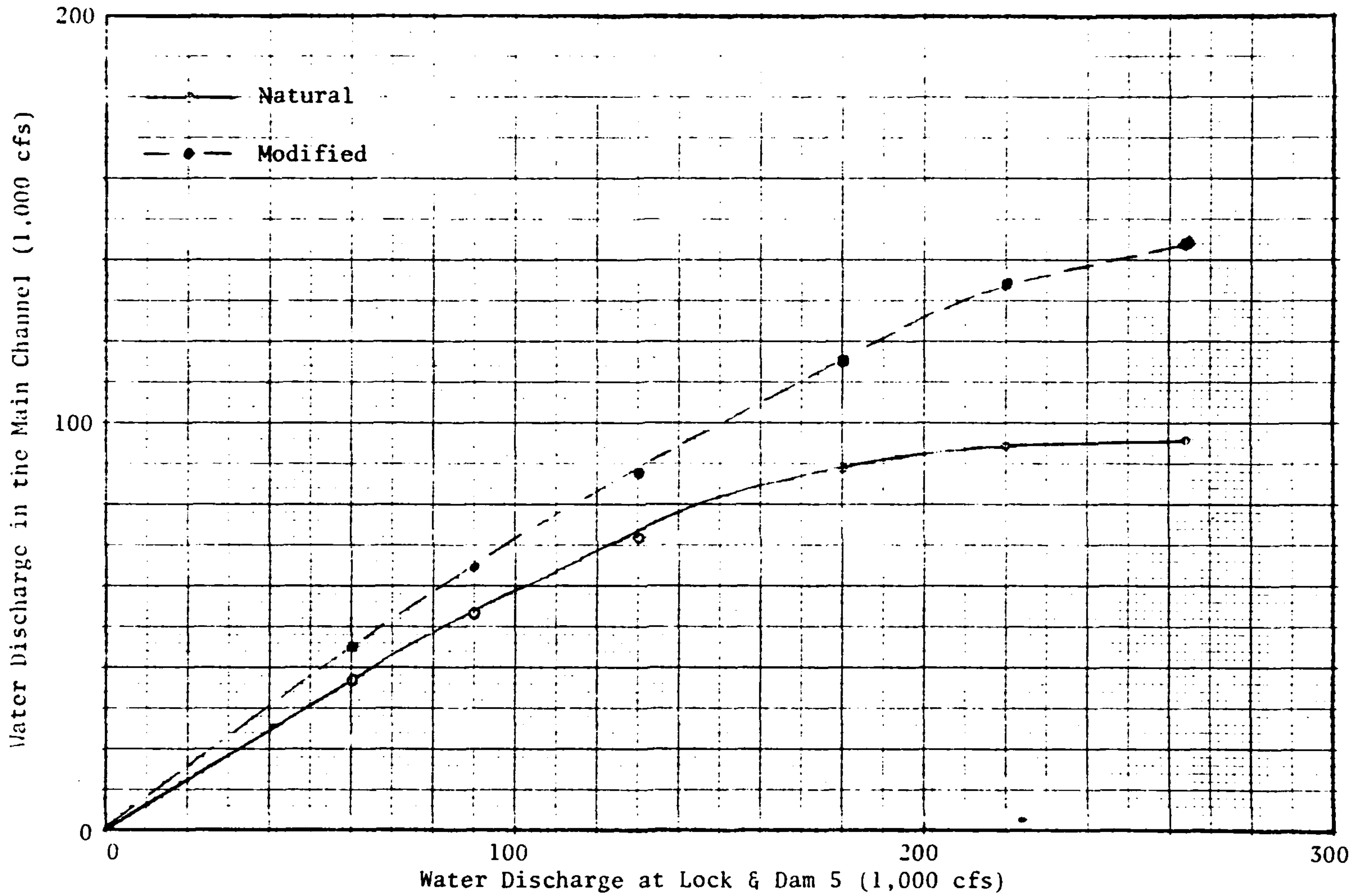


Fig. 4 Water Discharge in the Mississippi River Main Channel Adjacent to the Weaver-Belvidere Area

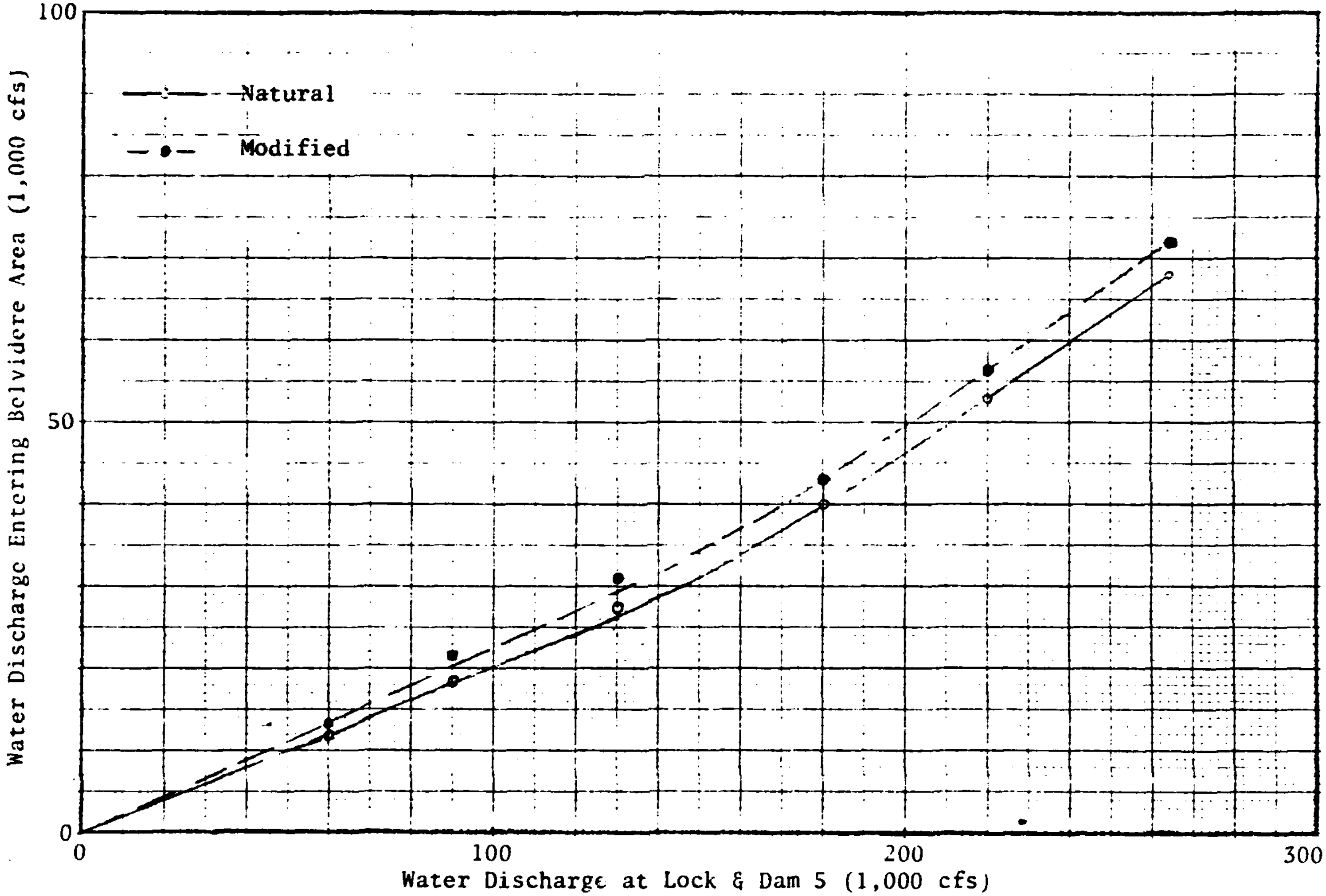


Fig. 5 Water Discharge Entering the Belvidere Area

REFERENCES

Nielsen, D. N., Fremling, C. R., Vose, R. N., and McConville, D. R., 1978, "Phase I Study of the Weaver-Belvidere Area, Upper Mississippi River," submitted to Side Channel Work Group Great River Environmental Action Team, by Winona State University and St. Mary's College, Winona, Minnesota.

Simons, D. B. and Chen, Y. H., 1977, "Hydrologic Study of the Weaver-Belvidere Area, Upper Mississippi River," prepared for the U. S. Fish and Wildlife Service, by Colorado State University, Fort Collins, Colorado, Report No. CER77-78DBS-YHC14.

Simons, D. B., Chen, Y. H., and Saez-Benito, J. M., 1980, "A Mathematical Model of Pools 5 through 8 in the Upper Mississippi River System," prepared for the U. S. Army Corps of Engineers, St. Paul District, by Colorado State University, Fort Collins, Colorado, Report No. CER79-80DBS-YHC-JMS21.

Upper Mississippi River Basin Coordinating Committee, 1970, "Upper Mississippi River Comprehensive Study, Appendix D: Surface Water Hydrology."

APPENDIX Q

SCOPE OF WORK FOR MONITORING THE KRUGER SLOUGH AND ISLAND 42 SIDE CHANNEL OPENINGS

To: GREAT September 30, 1977

From: Side Channel Work Group

Subject: Revised Proposal for Extending the WSU Side Channel Opening Contract

Approved by GREAT Sept 77

Subsequent to the September 8, GREAT meeting in Winona, the Side Channel Work Group prepared and unanimously approved a revision of the "side channel opening contract extension" proposal previously considered by the team. The proposal still requests funding an extension of an existing contract between the U.S. Fish and Wildlife Service (FWS) and Winona State University (WSU) (The contract provides for studies of the effects of altering side channels of the Mississippi River). However two additional items are included in the revised proposal.

In order that some of the studies results can be included in the GREAT I final report, an interim report will be prepared by WSU, to be due June 30, 1978. The interim report will be a brief written report, primarily describing the effects of the partial closing dam at Devils Cut. Any additional conclusions which have been derived from the study by June 1978 will also be discussed in the report. A complete final report will be due January 31, 1979.

The second addition to the proposal is to be an interagency, cooperative monitoring program for Fountain City Bay, Kruger Slough, and Island 42. The program would provide for qualitative and quantitative monitoring at these sites from 1979 thru 1982. The cooperating agencies would be the MinnDNR, the WisDNR and the USFWS. Yearly progress reports would be prepared by each agency, and a final cumulative report will be prepared in 1982 under the direction of the UMRCC coordinator. Each of these potential participants have offered their support for this program. WSU has also offered assistance in the long term program by providing hydrologic monitoring at Fountain City Bay.

I believe these two added project items provide the necessary elements that the GREAT found lacking in the original proposal at the September meeting. The revision has caused the proposed budget to be approximately $2,000 larger than the last budget. The SCWG has therefore unanimously recommended that the GREAT vote final approval for funding the existing contract extension package.

CONCEPT

Topic: Extension of existing contract ($159,000, FWS funds) to determine the effects of side channel alterations through 1978, and to continue effects monitoring through 1982.

Problem: In June of 1975, the GREAT set a 3-year contract (thru the FWS) with WSU to provide documentation of the effects of side channel openings (later to include other types of alterations). The contract established three sites, which would be altered by a GREAT side channel modification project, to be used for this documentation. However, only one site, Fountain City Bay, has had an alteration

project, and it was accomplished a year and a half latter than was expected when the contract was set.

As a result the GREAT still has no viable documentation of the effects of side channel openings. Further, due to the absence of spring high-flow stage on the Mississippi during 1977, there is still no conclusive data on the effects of the partial closing dam at Devil's Cut.

Need: An extension of the FWS-WSU contract and an extended monitoring program are needed to document the effects of side channel opening and alteration. Two side channel openings (Kruger Slough and Island 42) and Fountain City Bay need to be monitored closely for at least one year and monitored less intensively for four additional years to fill this need. It would be far better to continue the full monitoring program for five years. However, the program proposed would adequately accomplish the objective. The information to be obtained, while not being available for inclusion on the GREAT I final report, will benefit the whole of the GREAT program and be available for inclusion in either the GREAT II or III reports.

One of the primary objectives of the GREAT has been to document the effects of opening or altering side channels from the main channel to the backwaters of the river, to determine whether these techniques would actually benefit the backwaters. This documentation and determination can not be done without actually monitoring actual side channel openings and alterations.

The culverts to be placed at L/D #5 can not be used for side channel documentation, because the culverts are not side channel openings. The culverts can be shut and opened at will. They are purposely designed to draw from relatively deep, sediment free water. They will have trash racks on them. A side channel opening (or the alteration at Devil's Cut) has none of these convenient management advantages. Side channel openings may fill in. They may cause undue sediment transport into the adjacent backwaters. They may have numerous other problems due to their uncontrolled character. The culverts at L/D #5 will not be subject to these potential major problems. Therefore, a seperate documentation program, monitoring actual side channel openings and alterations, is needed in order to validly make conclusions about the effects of openings and alterations on side channels and backwaters.

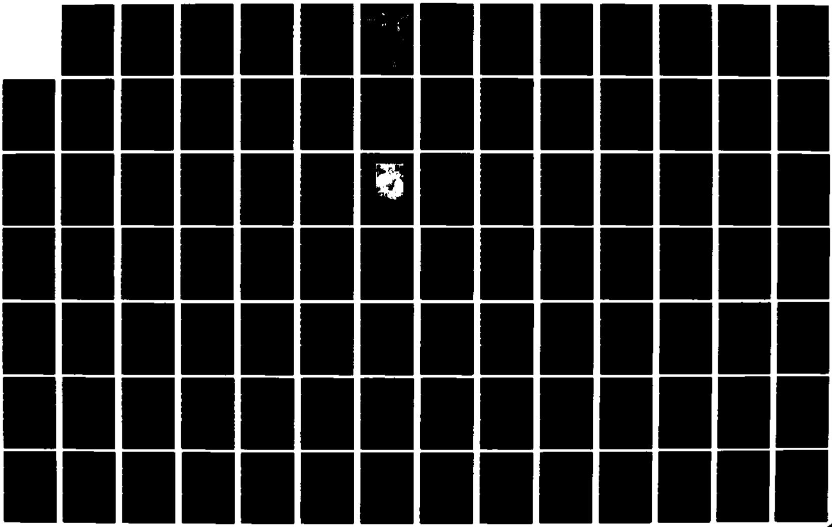
Contract and Program Required: Two seperate phases will be involved. The first phase is the extension of the current FWS-WSU contract. The second phase is a cooperative monitoring program between the MinnDNR, WisDNR, and the USFWS.

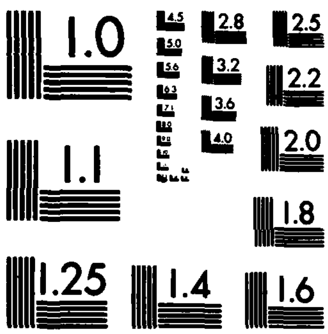
FWS-WSU Contract

A new contract with Winona State University is not necessary. The existing USFWS-WSU contract can be extended without a new contract or extensive red tape. The parameters to be studied under the extension are listed in attachment #1. Parameters proposed for Kruger Slough and Island 42 are based upon parameters studied during 1976-1977 at these sites by the Minnesota DNR (Lake City Office).

AD-A127 212 GREAT I STUDY OF THE UPPER MISSISSIPPI RIVER TECHNICAL APPENDIXES VOLUME 5 FISH AND WILDLIFE PART II(U) GREAT RIVER ENVIRONMENTAL ACTION TEAM M J VANDERFORD SEP 80 4/5

UNCLASSIFIED F/G 13/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

1979-1982 Monitoring

Long term monitoring will be accomplished as work contributions by the Wisconsin DNR (Mississippi River Work Unit), the Minnesota DNR (Lake City Area Office), the U.S. Fish and Wildlife Service (St. Paul Field Office), and Winona State University (Geology Department). At least once each sampling season, from 1979 thru 1982, each of these groups will take responsibility for taking a set number of measurements at one of three locations. The WDNR and WSU will share responsibility for monitoring Fountain City Bay (primarily the area of Kieselhorse Bay, Devil's Cut, and Merrick State Park). The MDNR will be responsible for monitoring Kruger Slough, and the FWS will be responsible for the new Island 42 cut area. No direct cost to GREAT is anticipated for this work.

Each of the cooperative groups will prepare a brief written report on the results of each years survey. The reports will be submitted to the coordinator of the Upper Mississippi River Conservation Committee (UMRCC) who will incorporate them into each years Proceedings. When all of the reports have been submitted for the last (1982) surveys, the UMRCC coordinator will be responsible for having a cumulative final report prepared. The final report will specifically address the question of the effects of side channel openings and alterations, whether these effects are beneficial for the backwaters, and whether a regular management program of side channel alterations appears to be justified.

Specific parameters proposed for monitoring and expected work requirements to accomplish each years survey are shown in attachment #2.

Costs: The budget for extending the FWS-WSU contract is shown in attachment #3. It is basically the same budget as presented in September, except for an increase of approximately $2,000 to cover the effort to produce an interim report. The total WSU (St. Mary's subcontractor) budget is $36,959.68. Adding 10% for FWS red tape brings the cost to $40,655.65.

No cost to GREAT is anticipated for the long term monitoring thru 1982. This includes hydraulic survey work by WSU each spring. These work items can be incorporated into each of the individual agencies work schedules.

Recommendation: The SCWG, representing the biological expertise within GREAT, requests and recommends that the GREAT approve funding for continuing work on determining the effects of side channel openings and alterations. This includes extending the currently existing contract between the FWS and WSU. All direct GREAT funds will go into this phase. The total cost is $40,655.65.

The SCWG believes this to be a very good proposal for the amount of funds required of GREAT. Extension of the WSU contract to cover detail monitoring thru 1982 would be much more desirable. However, the proposal outlined is recommended as adequate to address the objectives of GREAT.

Michale J. Vanderford

Michale J. Vanderford
Chairman, SCWG

Attachment #1
Proposed Parameters for the FWS-WSU
Contract Extension

Kruger Slough and Island 42

Surveyed by MDNR (76-77):

depth (cross sections)
bottom types
water chemistry
- DO (day, night)
- Secchi
- several nutrients

benthos (qualitative)
vegetative cover (qualitative)
fish
- electrofishing
- trapnetting
- seining

wildlife observations

* = significant over MDNR survey

(77) = will require pre-opening data collection (1977)

Proposed for Extension Work:

depth (cross sections)
*water flow
- velocity
- direction

*sediment analysis (77)
- % sand, silt, clay
- grain size
- organic content

water chemistry
- DO
- Secchi
- turbidity

*benthos (77)
- relative abundance by family

*aquatic vegetation (77)
- abundance
- distribution
- submergent & emergent macrophytes

fish
- electrofishing
- trapnetting
- seining

*wildlife (77)
- wildlife observations
- beaver & muskrat survey
- (each wildlife survey to have control)

*aerial reconnaissance and photography

Fountain City Bay

hydraulic
- depth profiles

hydrological
- high flow inflow
- flow direction
- suspended solids
- suspended solids grainsize
- (checked at high flow & mid-summer)

water chemistry
- DO
- turbidity
- light transmittance
- conductivity

aquatic vegetation
- Devil's Cut
- upper & lower Indian Creek

fish
- sample at closing dam
- sample at Indian Creek

wildlife
- morning & sunset observations at 3 locations in Devil's Cut

primary productivity
- periphyton biomass

aerial reconnaissance and photography

Attachment #2
Proposed Parameters for the 1979-1982
Monitoring program

For Kruger Slough (MDNR) and Island 42 (USFWS)

depth (cross sections)
bottom type (at selected sites)
DO (day and night readings)
turbidity (turbidometer)
Secchi disk readings (if feasible)
vegetative cover (submergent and emergent)
    rough per-centage of type
    rough mapping estimate
benthos (qualitative)
    relative abundance by family at selected sites
optional: (not included in time requirement estimates)
    fisheries survey (electrofishing or seining)
    wildlife observations (sitings and signs)

For Fountain City Bay (WDNR and WSU)

All parameters listed above but adding:

depth (at benchmarkers in Big Marsh and Cochrane Ditch)
hydraulic measurements (handled by WSU at spring high flows)
    inflow
    flow direction
    suspended solids (at Devil's Cut)

Estimate of Time Requirements for Each Years Survey
(not including fisheries or wildlife options)

Field and lab work
2 biologists X 3 working days

Report preparation
1 biologist X 5 working days
1 typist X 2 working days

Hydraulics investigation at Fountain City Bay
This work to be performed by Dr. Dennis Nielsen's hydrogeology class at WSU. No estimate of time requirements.

Final cumulative report
UMRCC to be responsible for preparation. Time estimate not possible at this time.

Attachment #3

Budget for FWS-WSU Contract Extension

Winona State University Portion

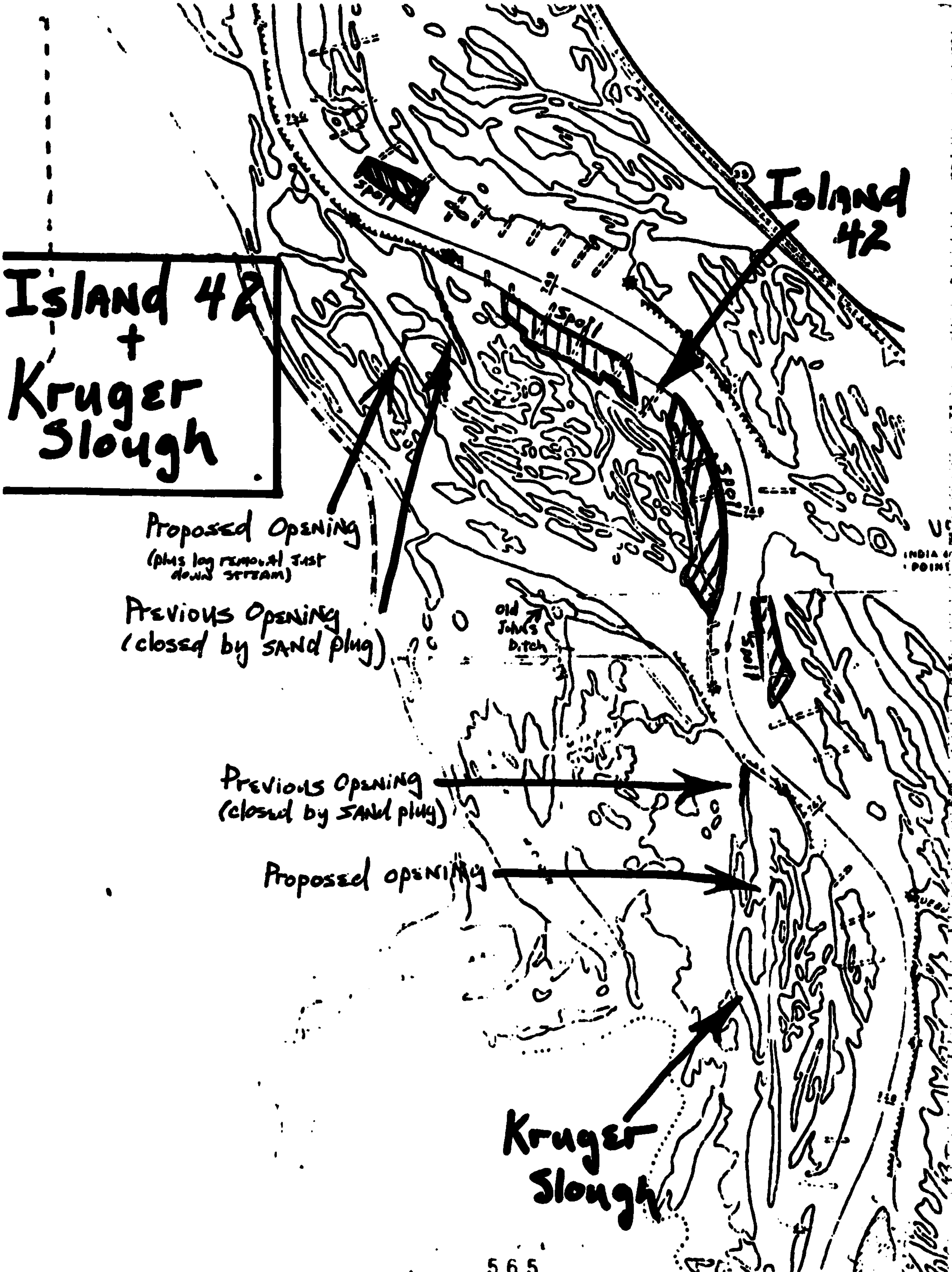
Staff			
C. Fremling	176 hrs.	19.25/hr.	$ 3,388.00
D. Nielsen	200 hrs.	13.20/hr.	3,640.00
W. Dunbar	24 hrs.	13.50/hr.	324.00
4 students	1440 hrs.	3.50/hr.	5,040.00
secretary	160 hrs.	3.50/hr.	560.00
			$11,952.00

Overhead (31.8% of salaries)	$ 3,800.74
Fringe Benefits (17% of faculty salaries)	1,079.84
Boat and Plane Rental	850.00
Supplies, Printing, Photography	600.00
Travel	300.00
	$18,582.58

St. Mary's College Portion

Staff			
D. McConville	210 hrs.	12.00/hr.	$ 2,520.00
R. Vose	150 hrs.	12.00/hr.	1,800.00
R. Faber	180 hrs.	11.00/hr.	1,980.00
L. Dieterman	80 hrs.	12.00/hr.	960.00
student help	1070 hrs.	3.50/hr.	3,745.00
secretary	75 hrs.	3.50/hr.	262.50
			$11,267.50

Overhead (31.8% of salaries)	$ 3,583.07
Fringe Benefits (15% of faculty salaries)	1,089.00
Fringe Benefits - Secretary and Students (7%)	280.53
Boat and Plane Rental	900.00
Supplies	600.00
Travel	657.00
	$18,377.10
Combined Total	$36,959.68



Weaver Bottoms

APPENDIX R

MEMO OF MEETING REGARDING FLOOD STAGE IMPACTS OF THE WEAVER BOTTOMS REHABILITATION PROJECT.

SPFO

The GREAT Stage

Great River Environmental Action Team

FEDERAL BUILDING • ROOM 510 • FORT SNELLING • TWIN CITIES, MINNESOTA

538 Federal Bldg., 316 N. Robert St., St. Paul, MN 55101

April 24, 1979

Memo

To: John Wolflin and Wayne Knott, Co-Chairmen, GREAT

From: Michael J. Vanderford, Chairman, Fish & Wildlife Work Group

Subject: The Weaver Bottoms Rehabilitation Project

I met on April 18 with Larry Larson, David Kennedy, Tom Lovejoy, Scot Ironside, and Ken Jonas of the Wisconsin DNR in La Crosse. The subject of our meeting was the Weaver Bottoms rehabilitation project. Specifically we discussed the likely adverse impacts of the present proposed modifications on flood stages, local and state regulations dealing with the flood stage impacts, and possible alternatives to the Plan Formulation Work Group's recommended rehabilitation plan. The results of the meeting require that some additional work and coordination be accomplished before the GREAT addresses the issue.

The floodstage impact of the present proposal would be an increase of 0.3 to 0.6 of a foot, according to a quantitative recalculation by Drs. Chen and Simons of Colorado State University (letter of March 26, 1979). Though it isn't specifically stated, it is assumed the increase would occur in the main channel and Belvidere Slough upstream of Spring Lake to Island 42 (RM 743 to approx. 748). Larry stated that although such increases could be accepted by the Wisc. DNR if flood easements were required, it is very unlikely the state would approve a project having such adverse impacts. Larry indicated Wisconsin representatives on the GREAT would have to oppose the present proposal (copy attached). He further indicated the Minn. DNR would likely oppose the proposal because of the floodplain impacts also.

Assuming the present proposal to be unacceptable, we discussed ways to accomplish the goal of rehabilitating the Weaver Bottoms while avoiding unacceptable floodplain or sedimentation impacts.

The approach which appeared workable and acceptable to us is described on the following page.

1. Define all questions which have to be answered to evaluate and approve the rehabilitation pilot program at Weaver.

2. Develop a scope of work for a physical model contract which will address all of these questions and enable the GREAT, or its successor, to explore all possible design configurations for a project.

3. Build a physical model through contract and determine if a project design exists which will help the Weaver Bottoms without increasing flood stages or sedimentation rates in other areas. (Use the physical model also to test the math models of the river developed by CSU.)

4. If an acceptable design does exist, a long-range monitoring agreement should be developed and the project submitted to the Corps for processing and implementation. (It was not stated, but was understood, that should no design exist which could achieve the goals while avoiding the unacceptable adverse impacts, the project would not be implemented.)

We also concluded that it would be necessary to specifically define in our overall proposal who would be responsible for carrying out the proposal and how it would be carried out. This would be necessary due to the uncertainty of what will follow the GREAT's final report.

Generally, we agreed this new approach would provide the best possible hope for implementing the Weaver project, provide for a broad test of the math and physical modeling capabilities on the river, and therefore provide a solid base for developing rehabilitation or maintenance projects for other backwaters.

We also discussed the possibility of including the Lake Onalaska Area in the modeling project. This would give us a broader test base and provide practical information on what could be done to maintain present habitat values in Lake Onalaska. This may be pursued.

In conclusion, we determined that an alternative recommendation to the Weaver Bottoms rehabilitation approach approved by PFWG needs to be prepared for the GREAT's consideration. The alternative recommendation needs to be developed and discussed with the GREAT voting members before the GREAT finally considers the recommendations forwarded to it by the PFWG.

As the first step toward this goal, I've asked Larry Larson to prepare a list of questions he believes will have to be answered in order to approve the project. As soon as I receive this list, I'll begin working with David Kennedy on developing a scope of work for the physical model and on developing the alternative recommendation.

Michael J. Vanderford

Michael J. Vanderford

cc: Donald Buckhout, MDNR; David Kennedy, WDNR; Cal Fremling, Winona State U; David McConville, St. Mary's College, Winona; Daryl Simons, CSU, Ft. Collins, CO

Recommendation #16: (#11 in the FWWG recommendations list 10-19-78.)
Implement Phase II of the Weaver Bottoms rehabilitation (Fremling, et al, 1976) and conduct the Phase III study (GREAT, 1977).

Justification: On April 26, 1977, the GREAT agreed to a three-part program for the implementation of a remedial program for the Weaver Bottoms, Pool 5 (GREAT, 1977). The first part, Phase I, was to conduct a study of the likely affects of the remedial program on the flood-stage and sedimentation on the Wisconsin side of the river. The second part, Phase II, was to implement the rehabilitation program should Phase I show that the program's likely affects on flood-stages and sediment transport would be minimal. The last part, Phase III, was to conduct a follow up study of the Weaver and Belvidere areas to document the affects of the program.

Phase I is complete (Nielsen, et al, 1978). The study has concluded that at most flood-stages may increase on the Wisconsin side by a foot during moderate floods (Simous and Chen, 1977). No increase in predicted for abnormally high floods such as occurred during 1965 and 1969. Sediment transport will not increase in Belvidere Slough or Spring Lake.

The Phase I report has provided the positive answers needed to proceed with Phase II, implementing the rehabilitation measures. The rehabilitation program has been well researched (Fremling, et al 1976 and Nielsen, et al 1989), urgently needed to improve the Weaver Bottoms, and is needed to prove the methods being tried, so that they can be used to maintain and restore other back-water areas.

__Procedures:__ The projects required to implement the Weaver Bottoms rehabilitation project should be pursued through the Corps. The Corps could conduct the project with present authority as a predicted side effect of the rehabilitation project is improved sediment transport capacity of the main channel through the Weaver Belvidere area (Simons and Chen, 1977). Drs. Simons and Chen (1977) have calculated that dredging requirements would be reduced from 15 to 25% in the area if the rehabilitation project were implemented.

An Environmental Impact Statement (EIS) will very likely have to be prepared. Either the Fish and Wildlife Service or the Corps should be responsible for this.

APPENDIX S

REPORT OF DR. WILLIAM GREEN ON THE CHANGES OCCURRING ON THE UPPER MISSISSIPPI RIVER WILD LIFE AND FISH REFUGE FROM THE CONSTRUCTION OF THE LOCKS AND DAMS UNTIL 1960

ECOLOGICAL CHANGES ON THE UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE SINCE INCEPTION OF THE 9-FOOT CHANNEL

By
William E. Green
Wildlife Biologist
Branch of Wildlife Refuges

(Reprinted & Revised 1960)

U. S. Department of the Interior
Fish & Wildlife Service
Bureau of Sport Fisheries & Wildlife

ECOLOGICAL CHANGES ON THE UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE SINCE INCEPTION OF THE 9-FOOT CHANNEL

By
William E. Green
Wildlife Biologist

The Upper Mississippi River Wildlife and Fish Refuge was created by an Act of Congress on June 7, 1924. This Act authorized acquisition of bottomlands along 284 miles of the Mississippi River from the Chippewa River in Wisconsin to Rock Island, Illinois.

The farsighted conservationists who envisioned this refuge could not have foreseen the remarkable changes which were to take place on this vital link in the Mississippi Flyway system, for with the consequent impoundment and stabilization of water levels, the character and wildlife values of the river changed to a marked extent.

I wish to point out that while this paper concerns itself primarily with the Upper Mississippi Refuge proper, there have been an additional 280 miles of river from Rock Island, Illinois, to St. Louis, Missouri, known as the Mark Twain National Wildlife Refuge, dedicated to conservation of our wildlife resources and the management thereof for the benefit of the public and not for the benefit of a few individuals as was formerly the case on the lower river. Negotiations between the Fish and Wildlife Service, the Corps of Engineers, and the various State Conservation Departments

have resulted in plans making it possible to manage these lands for the benefit of wildlife and the general public.

Bottomland varies from 2 to 5 miles in width from the mouth of the Chippewa River to Prairie du Chien, Wisconsin. Below Prairie du Chien, bottomlands become narrower until reaching Bellevue, Iowa. Between Bellevue and Clinton, Iowa, wide bottoms are the rule. However, below Clinton, from Beaver Island to the lower end of the refuge, bottomlands are negligible except at the mouths of tributary streams.

Precipitous wooded hills, varying from 200 to 600 feet in height, border the refuge from Chippewa River to Clinton, Iowa. Below Clinton these hills give way to much more gradual slopes.

The Upper Mississippi River valley is unique in its flora and fauna. It enjoys conditions not generally associated with its geographic location. What has been referred to as a "pseudo-Carolianian zone" extends north along the Mississippi into the Alleghanian Zone. Thus, refuge flora and fauna, although primarily Alleghanian, have representatives of Carolinian species as well as occasional Canadian forms. A feature making the refuge even more interesting is the overlapping of eastern and western species and subspecies. There are also several high "sand prairie" areas scattered along the length of the refuge, offering habitat conditions normally found much farther west. These sand areas reach elevations high enough to protect them from severe floods, and consequently have developed a flora very distinct from that of the true flood

plain, with plants of dry upland prairie predominating.

At the time the refuge was established the river bottoms were primarily wooded islands, with deep sloughs the rule, but with hundreds of lakes and ponds scattered through the wooded areas. There were some hay meadows on the islands, together with some small farming areas, but the bottoms were essentially wooded. Marsh development was limited to the shores of the lakes and guts leading off the sloughs. Marsh flora was also limited, with river bulrush making up the dominant habitat. These marshes often dried up completely by the end of the summer. Also, many lakes and ponds dried up completely, while water levels in others receded markedly. Fish rescue work was a big activity, with crews rescuing fish trapped in bottomland lakes and ponds when the river receded.

Early investigators such as Vernon Bailey, F. M. Uhler, and A. O. Stevens found there was a nucleus of marsh and aquatic species present in the bottoms, but not in great abundance. Further, because most of the lakes and marshes were subject to periodic flooding and dried out in the summer and fall, marsh and aquatic development was limited. Bailey suggested whatever means possible to insure water in the lakes and marshes, and advocated construction of retaining dams to hold back flood waters.

Uhler also considered frequent changes in water levels of the flowing channels and the periodical or seasonal fluctuations in the lakes and ponds to have a greater effect on the development

of aquatic plants in general than any other factor. He, too, suggested construction of small dams to hold water in lakes and ponds when the water receded in the summer.

Constant drying out of marsh areas and ponds resulted in considerable loss to marsh and aquatic species, especially the annual plants. Re-seeding occurred during periods of floods in the spring and fall, but good aquatic beds were limited, and before they became well established recurring drying out would again eliminate or greatly reduce such growth.

At the time the refuge was established, the main species of waterfowl taken were divers, with scaup predominant. Puddlers were taken to a lesser extent because of generally poor habitat for them during the fall. In the spring, when the bottoms were flooded, a greater variety of waterfowl came through. Hunting was limited, and comparatively few hunters frequented the river area. Sporadic shooting often obtained during a few days of the "flight", but then shooting dropped off until the next movement occurred. Few birds remained in the area for any length of time because of the dearth of food.

The high, semi-dry bottoms at one time held higher populations of skunks, badgers, foxes, rabbits, etc., than occur at present as the habitat was more suitable for such animals. Present inundation has restricted high lands and has limited populations of upland species. Prairie chickens once utilized the bottomland meadows,

but, with the elimination of such areas, prairie chickens have vanished.

Muskrats were common even prior to flooding, but then a higher proportion of bank rats occurred than at present, and house rats were in the minority because of the lack of suitable marsh habitat with accompanying house-building material.

In the early thirties the Corps of Engineers initiated work on the 9-foot channel project for the Upper Mississippi. Thirteen of the 26 locks and dams constructed in connection with this project are located on the Upper Mississippi Refuge, and the first pool within the limits of the refuge was filled on May 29, 1935. The last pool on the refuge was filled in 1939.

This impoundment abruptly changed the river bottoms from an area of wide fluctuations in pool levels ranging from floods in the spring to drying out in the summer, to an area of semi-stabilized water in which, while spring floods still occur, the bottoms do not dry out in the summer. Thus, instead of wooded islands and dry marshes, we now have excellent marsh and aquatic habitat, with fairly stable water levels throughout the year. Even the two record floods in the spring of 1951 and again in 1952 do not alter the fact that water conditions are much more stable now than they were prior to impoundment. Spring floods always occurred, and they can be expected annually. However, instead of drying up in the summer and winter, there is now water available thoughout the year in the marshes, lakes, and ponds. Lack of marsh and aquatic

plants is no longer a problem, and fish rescue is a thing of the past. Hay meadows and timbered areas are now in marsh, which offers excellent habitat for furbearers and waterfowl.

In each of the thirteen pools on the refuge three distinct zones occur. The upper end of each pool is in essentially normal river condition, where the water levels were not raised to any extent. In this portion of the pools marsh development is limited, and the old condition of deep sloughs and wooded islands is found. In the middle of each pool, impoundment backed up water over islands and old hay meadows, spreading out over large areas of comparatively shallow water. It is in the middle portion of the pools that the best marsh development occurred. Immediately above each dam the water was impounded to a depth which precluded marsh development, and at present this area is essentially deep, open water, in which some aquatic growth occurs but in which there is practically no marsh.

The best marsh development on the refuge occurs north of the Wisconsin River. In this area, especially in Pools 4-7, the pools are short and impoundment had more pronounced effect on the development of habitat. Pools 8 and 9, although long pools, have developed much more than the long pools south of the Wisconsin River.

The area below the Wisconsin River has never been too attractive for waterfowl other than wood ducks except during periods of migration. Marsh and aquatic development is limited, and in

only a few places in Pools 10-15 do marshes of any size occur. These pools are long pools, averaging over 30 miles in length, and consequently the effect of impoundment is not too pronounced except at the lower ends of the pools. The upper half of each of these pools is in essentially natural river condition. While the water table has increased sufficiently to militate against agricultural use, causing abandoment of most such use in the bottoms, it has not created marsh areas found in the much shorter Pools 4-9, in which impoundment has changed the ecological picture to a much greater extent.

In addition to this factor, the lower half of the refuge has numerous large tributary streams, which often flood after flash rains and during spring break-ups, flooding the river bottoms and depositing silt. It is possible that eventually this silt deposition will build up deltas and shallow water areas in which marsh will develop later. At present there are more deep water areas in the lower pools than there are shallow areas which are conducive to marsh and aquatic development. Aquatics which do occur in the clearer deep water in the upper pools do not survive as well in the more turbid lower pools, and are accordingly more limited.

Also, in the upper pools clearing to the three foot contour above normal pool level was carried out well prior to flooding, and marshes have now come in in the cleared areas. In fact, some of the stump areas have the best aquatics of any part in Pools 8 and 9. Below Pool 9, however, clearing was still in progress

at the time the dams were finished, and impoundment was made before the clearing was completed. As a result, some of the lower pools have large expanses of dead flooded timber in which few marsh or aquatic species have come in. It is possible that if this dead timber could be cleared, or if it goes down in course of time by forces of nature, marsh and aquatic development might occur after the timber is removed.

On the upper end of the refuge the bottoms were relatively barren of any food and cover immediately prior to flooding. Timbered ridges and islands had been cleared, and the bottoms had been grazed.

The year following impoundment, very dense beds of Muhlenberg's smartweed came in, often in such dense beds that the bottoms took on the reddish tinge of the blooms. For several years this species supplied an abundance of duck food. It was the growth of this species which led to the enthusiasm with which Service personnel greeted initial improvement following first impoundment. For about five years following flooding this species produced an abundance of seed and during that time held the distinction of being the most important single species of duck food on the entire refuge. After about five years it was found that although in some areas it continued to make vegetative growth, in the few areas where it still hangs on it is almost entirely sterile. With the disappearance of this plant many areas had greatly reduced aquatic growth, but since various other acquatics, notably the pondweeds, have come in and have replaced it satisfactorily.

River bulrush, which was the most common marsh species prior to impoundment, has continued to be an important marsh plant. Coming in in dense, solid stands for several years following impoundment, this species deliquesced for a few years, but has since made a come-back and is at present an important marsh species, especially for muskrats. Although this species seldom sets seed to any extent on the river, there have been years when it seeded heavily, and then it was of considerable value to waterfowl also.

Round-stemmed bulrushes do occur, however, and are spreading more each year. Of these, hard-stemmed bulrush occurs rarely, although near Thomson, Illinois, an extensive marsh away from the river formerly occurred. This marsh has since been drained. Slender bulrush was formerly more common than soft-stemmed bulrush, but the latter has increased to the point now where it is even more common than the slender species. When impoundment first occurred round-stemmed bulrushes could be found in only small scattered patches interspersed with other marsh plants, but at present good-sized beds in solid stand can be found.

Cattail is still rare, although extending its range somewhat. Most of the stands are *Typha latifolia*, although there are two small areas in which *T. angustifolia* occurs.

Phragmites is important cover in Pools 5 and 8, although it is rarely found elsewhere on the refuge except in these stands.

Extensive marginal beds of smartweed and millet occur on most

ridges for the entire length of the refuge. Seven species of smartweed occur, although Pennsylvania smartweed is the most common and important. In the lower pools this association makes up a very important part in the food supply for waterfowl.

Burreed was present and well distributed, but not too abundant prior to flooding. Since impoundment this species has increased markedly. Shortly after impoundment the burreed-sagittaria association was the dominant emergent association on the refuge, but with the increase in other emergents, together with some reduction in burreed, the association is of lesser importance at the present time. It is still abundant enough, however, to be important for waterfowl cover, and for muskrat house-building material.

Rice cutgrass is well distributed on ridges and islands. Locally, extensive marginal stands of this species occur, and since it usually seeds well, it is an important food. In wooded areas another cutgrass (Leersia lenticularis) is often more common than is rice cutgrass. Both species are valuable as duck food.

Extensive stands of sagittarias occur, with S. latifolia on the semidry margins and shallow water, followed by a zone of S. arifolia, and with S. heterophylla in beds in deeper water. While these plants are often found in association with burreed and the bulrushes, there are extensive pure stands in many areas. These plants are important both to waterfowl and muskrats.

Wild rice makes intermittent growth, depending on water conditions, and at the present time there are good stands of rice present in the upper pools. Its ripening habit, together with the presence of myriads of blackbirds, which eat the seed almost as fast as it ripens, reduces its food value for waterfowl, although it is important as cover.

The most common aquatics on the refuge are American pondweed, sago, leafy pondweed, small pondweed, flat-stemmed pondweed, bushy pondweed, curly muckweed, coontail, elodea, water stargrass, wild celery, and the pond lilies.

Perhaps the most abundant species is American pondweed, which is the most important single species of aquatic so far as waterfowl food is concerned. This species occurs in all pools in extensive beds in a great variety of conditions from very shallow water to deep flowing channels. In the upper pools this species grows in such dense beds over extensive areas that boat travel is rendered difficult. It makes its best growth in water 12-30" in depth. This species normally is a heavy seeder and is of outstanding importance as waterfowl food.

Sago and flat-stemmed pondweed are also well distributed and abundant, both mixed with other aquatics and in pure stand. Sago ranks a close second to American pondweed, and has been increasing steadily. Flatstem, on the other hand, has fluctuated up and down, but at this time ranks third among pondweeds, and is often in pure stand over wide areas.

The coontail-elodea association formerly was the most common in ponds and lakes prior to filling of pools. Even after flooding the group was for a time the dominant aquatic association on the refuge. With continued stabilization of water, however, this association has been replaced over wide areas by more important pond-weeds. Locally, though, this group is still important.

Naias has increased, and at the present time occurs in pure stand over wide areas. This is especially important for blue-winged teal and baldpate, both of which feed heavily on the beds present.

Wild celery has spread until it can now be found almost the entire length of the refuge. It is most common in the upper pools, however.

So diversified are the aquatics on the refuge that it is not unusual to be able to find more than two dozen species in a matter of minutes anywhere in the better marshes and aquatic beds.

Some idea of the variety of flora and fauna present on the refuge can be gained from considering that there are 252 species on the refuge bird list; 26 larger mammals; 113 species of fishes; and at present the herbarium boasts nearly 1,000 species of plants.

The increase in waterfowl usage is phenonemal, both as to the number of species and the length of time they frequent the area. An average of about 25 million days-use by waterfowl are recorded each year, and nearly all species of ducks use the refuge during

spring and fall. The fall flight was formerly mostly divers, but now the puddlers have outclassed them in abundance. During the period 1953-1959, puddlers averaged over 15 million days-use each year, and divers over 8 million days-use. Fall flights of puddlers average over 8 million days-use, compared to 2 million days-use for divers. In the spring, however, heavy diver use in recent years has increased and puddler and diver use are comparable, averaging over 5 million use-days each. It is evident, however, that marsh development has greatly improved the area for puddle ducks.

Hunting has also increased markedly. Where in pre-impoundment days very few hunters shot waterfowl in the bottoms, the sport of waterfowling has increased in popularity. During the period 1955 through 1959, an average of over 105,000 days of duck hunting occurred each fall, with a high of nearly 130,000 days of water fowling in the fall of 1957. Further, it is noted that even in the spot checking done in connection with bag check investigations, where only a small percentage of the hunters is contacted, it is not unusual for our staff to contact 5,000 or more hunters in a season. The refuge is one of the top three in the country insofar as public use is concerned, receiving approximately 3 million visitor days use annually for such purposes as hunting, fishing, trapping, sightseeing, birdwatching, boating, picnicking, etc.

Moreover, marsh and aquatic development, together with our management system, has resulted in ducks remaining in the area

throughout the fall, with the result that hunting opportunities now extend throughout the season, rather than being concentrated in only a few days during the "flight" as was formerly the case.

Fur animals have also increased markedly. Beavers, once almost extirpated from the river, were restocked in 1927 and 1928. With this stocking, and probably some influx from tributary streams, beavers increased so that open seasons on this species have been possible since 1948. Through 1960 a total of 12,678 beavers has been trapped from the refuge.

Muskrats, too, responded to marsh development, and an average of 45,000 are removed annually. In 1940 eighty-seven thousand were taken, and in 1958 eighty thousand were removed. Between 1940 and 1960 over 800,000 muskrats have been taken from refuge lands. During that same period more than 19,000 minks have been taken.

The increase in popularity of trapping is shown by the fact that between 1940 and 1960, an average of 725 trappers per year take out permits to trap on the refuge. These trappers annually harvest nearly $70,000 worth of furs, and from 1940 to 1960 nearly one and a half million dollars worth of furs have been taken on the refuge.

While some animals, such as skunk, badger, rabbits, etc. have been reduced in numbers because flooding reduced or eliminated suitable habitat, others have increased. In addition to the increase

in muskrats, minks and beavers, the raccoon has increased to almost a saturation point. Also, otters have increased to the point where limited trapping has been permitted since 1953.

Deer are more plentiful, too, although marsh development has not been a factor here. There are now more deer in the bottoms than before the refuge was established, with over 1,200 present each year.

Thus it can be seen that impoundment by the Corps of Engineers in connection with their 9-foot channel project has created much more favorable conditions for fish and wildlife than prevailed before, and has brought about marked ecological changes on the Upper Mississippi Refuge.

APPENDIX T

ARTICLE FROM OUTING (MAGAZINE), 1892,

DESCRIBING HABITAT CONDITIONS AND WOODCOCK

HUNTING ON THE UPPER MISSISSIPPI RIVER.

Outing volume: 20: page 293-297 1892

WOODCOCK SHOOTING ON THE UPPER MISSISSIPPI.

BY T. S. VAN DYKE.

IN few places has there ever been woodcock shooting that for certainty of finding the birds and ease in following them equaled the sport of the bottom lands of the upper Mississippi River twenty years ago. Scarcely any of the resident sportsmen then troubled this charming bird, the estimation of game at that time depending entirely upon the number of pounds avoirdupois that reached the ground after the report of the gun. The market shooter was then unknown upon those grounds and I enjoyed a practical monopoly of the woodcock shooting for miles below the foot of Lake Pepin. The bottoms were then very different from what they now are, when much of the timber is gone and the sloughs of once clear water are muddy and full of sawdust instead of fish. Then when the light canoe left the river it entered a new world, as the cedar paddle sent it gliding swiftly among fallen trees, driftwood and sand-bars, around sharp elbows and through swirling eddies. The soft, warm air, the strange fragrance wafted by the light breeze, the hum of bees and a thousand other insects, the banks of deep, dark soil, densely covered with long grass, the heavy masses of climbing vines that festooned with showers of green and white the tangled brush or fallen tree-tops, the immense growth of flowers of a thousand kinds, reminded one of the tropics. Yet the wide, waving arms of the elm along the banks, and the maple's head, broad with silvery green, brightly pictured in the smooth water, quickly broke the illusion. Above the dense undergrowth of soft maple, swamp-oak and poplar the ash reared its dark green form, trim and stately the basswood stood on every side, while aged cottonwoods, still proud in death, raised their ragged, storm-scarred limbs skyward as in defiance of the elements. In the openings the flag stood in serried ranks along the edges of little ponds, and from the water rose the luxuriant wild rice.

Outstretched on many a limb lay the gray squirrel with bushy tail outspread, taking his midday rest, and on many a tree sat the wild pigeon, nodding with curiosity, while others, like arrows feathered with white and gray, hissed with speed through the openings in the timber. Dark, shining turtles slipped with soft splash from the logs of driftwood or waddled off the sand-bars, while the kingfisher sprung his noisy rattle from the dead limbs that overhung the stream. Blackbirds with burnished necks of bluish green and others with red-barred wings rose in roaring flocks from the reeds, and the wood-duck with her dolorous "wee, wee, wee, wee," winged her way up the stream while the little brood paddled the reeds for safety.

My first trial of those grounds was with a friend from the East. On the edge of the little side slough in which we first landed we found the soft mud by the water's edge riddled with small holes. The dog had not yet smelt a woodcock in Minnesota, and while coming up the slough had looked intensely disgusted, for since he had been in the country he had hunted only on the prairie. But now he looked happy at once, and with cautious trot and gently swaying tail keeping time to the motion of his legs he plunged gayly into the reeds.

But scarcely had he vanished when the reeds and grass stopped waving above him and the sound of his feet in the mud ceased. We soon found him standing perfectly still with head projecting from a strip of reeds partly covering a point of muddy shore. His nostrils twitched faintly at the corners and his eyes were staring confidently at the muddy shore ahead of him. But a yard from his nose, in the shade of some water-lilies left by the receding water, sat a full-grown woodcock. Numerous small holes were in the ground around him, fresh mud was on his bill, and he had evidently been breakfasting late and paused to inspect the party. His strangely shaped head was drawn well back until its rich colors blended with the rosewood tints of his back, and his large, dark, liquid eye was quizzing us with sublime indifference to the dog.

With whistling wing the bird whirled upward in a spiral line over our heads before we were fairly out of the mud and vanished through the tree-tops with two charges of shot scattering ruin among caterpillars' nests and leaves in his rear. My friend and I looked at one another in blank amazement, each chuckling internally with satisfaction at the other's missing. By the time we had loaded our guns all was again quiet and the little birds that had been scared by the noise were soon as busy as ever.

The rustling of the dog in the reeds soon ceased again and we found him in a clump of saplings standing calm and solid as the Sphinx, with one forefoot on a fallen log which he was evidently about to cross as he had caught the scent of the bird. With soft twittering of brown wings a woodcock rose a few feet ahead of him as we came up, making, as we raised our guns, so sudden a turn downward that neither of us fired. Scarcely thirty feet from where it rose it alighted upon the ground, then with drooping wings and tail erect and outspread like that of a turkey-gobbler it strutted along for several yards with the dog pacing solemnly behind it at a safe distance, watching the bird intently and evidently much surprised at this peculiar action, which many dogs and many sportsmen have never seen. Suddenly the bird ran into a little bunch of thin grass and squatted along its edge as unconcerned as if hidden in a jungle, while the dog as suddenly stopped and looked around at us a moment as though amazed at the bird's coolness and then settled to a rigid point.

We came up to within fifteen feet of it, when with a flash of brown and a whistle of swift wings the game was lost to sight in an instant in the dense cover of the leaves above. But almost as quickly two loads of shot rent the foliage from two different directions across the path of the bird, and amid a small shower of leaves and twigs it came tumbling down with a small cloud of fine feathers floating slowly after it.

A few yards beyond, the brush opened into a shallow slough full of wild rice, into which the dog plunged, while out of the edge of it came two woodcock wheeling over the timber above us. As we fired both the birds pitched downward in succession, and in a moment more the dog came out of the reeds bearing in his mouth, alive and unharmed, a young wood-duck nearly full grown. The scamp seemed quite unconscious of having flushed any woodcock in his eager hunt for the ducks, which at this stage of growth run into cover instead of flying, and set the best-broken dogs half crazy. He seemed quite astonished when we took him to retrieve the two fallen woodcock, but quickly recovered from his surprise and galloped away to the reeds again and brought out another duck.

Along the shady sides of strips of timber, with open grassy slopes merging into the reeds that fringed the edges of little ponds, our sport continued, the dog trotting cautiously with upraised nose along the outer edge of the reeds, occasionally poking in his nose for a closer inspection. Suddenly his body disappeared within the reeds, leaving only his tail visible along the outer edge. And so long and so rigidly did this remain in one position that we hastened to see what it meant. We found it quivering with its owner's attempts to hold it still; and as we came near him, out from almost beneath the dog's nose came a large woodcock, wheeling so close to my head that neither I nor my friend was able to shoot at it until it swept over the tree-tops behind us. And then nothing came down at the report of the guns but some leaves and twigs. Yet we fancied that something brown settled softly down into the timber beyond. We went to look; the dog quickly drew and walked slowly up to a wing-tipped bird that was making off toward a clump of dense grass along the outer edge.

As we went from the timber to the ponds again, two more woodcock rose from under the top of a fallen tree around which was a heavy growth of grass and weeds. If anything can excel the brilliancy of cutting down on the right and on the left, one with each barrel, two birds that spring together it is the dexterity with which two barrels can often be emptied at a single bird without ruffling a feather. And no one could help admiring the grace and speed with which my friend executed a flank movement of smoke and flame on the tail feathers of the first bird before it was a yard from the tree-top, and then, wheeling halfway around, emptied

his second barrel at the other before I had fairly caught sight of either. What the writer did is none of the reader's business.

With birds rising in this way, a very short time on pleasant days used to afford all the shooting a reasonable mortal could want. It always grew better toward evening, and then the homeward trip was ever a pleasure. Swiftly the little boat glided down the slough to the great river in the falling of the twilight. The muskrat clove the dark water ahead of the boat, leaving a rippling wake as he passed; the night-heron flapped his solemn way in the air above, and the deep "too hoo" of the great owl resounded far and wide through the darkening green The smooth face of the great river glimmered with crimson and gold mirrored from the fleecy clouds above; and far up and down the Minnesota side the long line of bluffs lay darkly blue, while on the Wisconsin side they retained a last lingering trace of pink, as if unwilling to let go of day. Long pickerel shone for an instant as they threw themselves in air and sank back with a splash into the water; night-hawks by the score pitched here and there over the water; little bands of ducks went whizzing by, and from both shores in every direction rolled across the waters the rich but mournful monotone of the whip-poor-will.

He who has never seen woodcock-shooting on these bottom lands at high water has missed the rarest of all sport with the shotgun. It is something rarely, if ever, seen on the Atlantic coast and rarely in the Western States, except on streams like the Upper Mississippi. And even there it could be seen only in occasional years. In most sections where this bird is found, heavy rains scatter it over the whole country instead of concentrating it. But on the Upper Mississippi the woodcock are always confined to the bottoms of the river, and never go in any numbers to the bluffs or the low benches of land between the bluffs and the river. Suppose, now, that when they were numerous throughout the bottoms generally, the river should rise just high enough to cover about four-fifths or nine-tenths of the bottoms, leaving the whole a network of islands and peninsulas, among which, in a little boat, you may paddle anywhere. Does it need much stretch of fancy to picture the intensity of the shooting that may be had at such times? And when it is one of the noblest of game birds — the one of all others with which the soul of the sportsman is most deeply and quickly charmed — what can equal it?

You have, perhaps, seen a dog point from a wagon on the prairie. But have you ever seen him refuse to get out of a boat when it touched the shore; or, if he did step out, remain standing in the water beside it? Such was a common sight on the Upper Mississippi in days of high water.

As you step from the boat a woodcock rises a few feet from the shore with that mellow whistle of wing so enchanting to the soul of the sportsman. A puff of feathers comes from it at the report of the gun as it is wheeling over the tree-tops and it falls through the dense green beyond. As the dog goes to retrieve it he stops halfway and stands with upraised forefoot and rigid tail. As you go up to the dog a bird springs from the ground a few feet ahead of him and vanishes in a spiral line through the green canopy above. Over the tops of the trees it wheels and away it scuds across an open piece of water for the next island beyond. But, as the dim line of brown and buff fades through the dense foliage, a charge of shot flies across its path and down it goes into the open water.

Make no more such shots as that to-day. Too much time will be lost in retrieving the game, for the dog cannot see it fall. As you will now have your choice of shots, it is best to take such birds only as will fall where they may be quickly found.

The dog soon finds the first bird that fell, and as you take him to retrieve the second one he refuses to go faster than on a slow walk. This gait settles at once to a crawl and, just as he is about to stop, three woodcock whiz out of a bunch of grapevines along the water's edge. One falls almost beside the bird you are going to retrieve and the other two disappear in the brush over the next piece of water. Crossing with the boat to the next piece of dry land, which is much larger than the last one, you pick up the fallen birds as you go and let the dog swim across. He soon reaches the opposite shore, shakes the water from his sides and walks with

cautious sniff of upraised nose toward the first projecting bush. He stops a moment for a longer sniff of the air, which not proving entirely satisfactory, he swings cautiously around to the leeward side, where his tail, which has been wavering in a manner expressive of considerable doubt, becomes suddenly as stiff as an icicle. Before you have the boat moored four woodcock spring from the driftwood and grass ahead of the dog and start for the four points of the compass. Out of a shower of fine feathers one falls in a twinkling into the brush, while another making rapid time across the open water descends with a splash into it.

Entering the timber the dog comes to a sudden stop and two twittering brown lines dart away from in front of him amid the roar of two successive barrels which send both of them whirling downward. But scarcely a step does the dog take toward them when he again stops and turns his nose, first to the right, then to the left, then to the right again. Before you can take another step ahead away goes a cock on the right, then another on the left, with three or four more rising out of a clump of grass-grown driftwood ahead, and before you or the dog can reach the first one that falls half a dozen more are twisting with whistling wing in every direction. And so you may go on from island to island with the dog not even walking, but half the time merely crawling about with thievish stealth and every minute or two stiffening into a rigid point.

During high water on these bottom lands the woodcock are generally much wilder than usual. Many rise far ahead of the dog, many lie in the edge of the timber and wheel away upward on the outside while you are inside, or dart away across the water to the next island. Some twist upward among the tree-tops and then spin away on a straight line; some whisk away so close to the ground that the brown line of their flight is hard to distinguish from it, while others bustle out of sight in a twinkling through some dense thicket.

You do some missing, as who will not? Here goes a bird whizzing across an open place only twenty-five yards away. Clearly along the iron rib of the gun you see the rich brown robes of this prince of game birds and the gun (as you think) pointing just a foot ahead of him. You see so plainly his rich colors and his long bill that you feel a sublime confidence. What a perfect aim! How exactly in line! How nicely calculated at the proper distance ahead of the game! How cool you feel, and what an immensity of confident expectation is crowded into one short instant! You pull the trigger and the brown line whistles on without wavering or shedding a feather on the air, leaving you so engulfed in amazement at the fact, that you forget to shoot at two other birds that rise at the report of your first barrel.

The most hardened nerves may become fluttered by such fast rising of birds as was often seen on these bottoms at such stages of the water at the right time of the season. To have a fresh bird bustling up as you go to pick up a dead one, and killing the fresh one, to see your dog pointing another before he or you can reach either of the two that have fallen, and then to have a couple more spring right and left before you can reach your dog, will turn into a shuttle the heart of the most experienced shot. It is then almost impossible to preserve that coolness indispensable for steady shooting. The finger will sometimes betray one and pull the trigger when the eye plainly sees that the gun is not pointed at the right spot, and sometimes it will tremble and balk upon the trigger and disobey one's will to pull it at the right instant. Sometimes, when a quick shot is necessary, the gun fails to come to the right place as you raise it and it cannot be shifted before the bird is out of range. Sometimes when thrown up at a crossing bird it comes directly upon the mark and the temptation to pull the trigger at once instead of shifting the gun ahead to the proper place is irresistible. And often, in coming up, it strikes an unnoticed branch or twig; and frequently when wheeling suddenly with heavy pockets swinging around, one is thrown out of balance and cannot recover it in time. These and a dozen other causes—above all, that mysterious "bad spell" which at times attacks the best of shots—make it impossible for any one to shoot without an occasional miss. Thanks to human infirmity that it is so! Were it otherwise, most of the pleasure of the field would be gone.

produced from OUTING (*Vol. XII., p.* [illegible]).

THE WOODCOCK AT HOME.

APPENDIX U

RECOMMENDATIONS NOT APPROVED BY THE FWWG

Outline — Page

A. DISAGREEMENTS

The members of the FWWG submitted many recommendations to the work group as a whole suggesting ways to solve the identified fish and wildlife resource problems. However, the work group did not approve all of the suggested recommendations.

During the process of developing work group recommendations, conflicts arose over management policy and authority for managing areas of the Mississippi River, especially on the Upper Mississippi River Wild Life and Fish Refuge. Those conflicts were present because each management agency involved on the work group has a different primary management objective for the river's resources.

For this reason, some FWWG recommendations which were approved were listed with alternative procedures, because work group consensus could not be reached. Those alternatives not approved by the work group at all were (1) substantially modified so they could be approved, (2) referred to another GREAT work group with more expertise in the subject, or (3) discarded.

The following lists those alternatives which were considered as recommendations but were not accepted by the Fish and Wildlife Work Group. The reasons each was unacceptable follow each alternative.

B. POLICY CHANGE RECOMMENDATIONS NOT APPROVED

1. Recommendation

   Authority and funding should be provided to enable the Corps of Engineers to include fish and wildlife as project purposes of the Upper Mississippi River 9-foot navigation channel project. Explicit in this authority would be the authority to alter side channels, alter traditional dredged material disposal methods, and construct control structures affecting

the flow of water through and from the main channel of the river to benefit fish and wildlife. Also included would be authority to open side channels for recreational benefits.

Reasons Not Accepted

While the intent of this alternative met unanimous work group support, the detail of the recommendation did not. A different alternative was selected (Recommendation 1) to address this problem, but the basic concept was the same.

2. Recommendation

The Corps, Fish and Wildlife Service, and States should agree to limit dredging activities in specific areas of the river during the spring and fall when herons and egrets are nesting and waterfowl migration is at its peak.

Reasons Not Accepted

The work group felt that this concern had already been incorporated, in more general terms, as recommendation 1 which says Corps of Engineers dredging and disposal policy should be accomplished considering protection of fish and wildlife resources.

3. Recommendation

A standing On-Site Inspection Team (OSIT) should be established to coordinate dredging activities until the GREAT pool plans can be agreed upon and authorized by Congress.

Reasons Not Accepted

The work group wanted to continue the OSIT process even after the GREAT pool plans were adopted. A modified version of this recommendation (Recommendation 3) was adopted.

4. Recommendation

The Corps, Fish and Wildlife Service, and States should agree to attempt to manage pool levels to benefit fish and wildlife.

Reasons Not Accepted

This recommendation was modified and became recommendation 4. It was expanded to explain the implementation procedure.

5. Recommendation

A comprehensive program to evaluate the concept of riverine disposal should be developed.

Reasons Not Accepted

The work group felt that there were too many factors associated with a riverine disposal pilot project that could not be adequately monitored. Primarily, there was no way to measure possible impacts on sedimentation in side channels.

6. Recommendation

The Corps should study the feasibility of using dredging materials in concrete riprap suitable for the enhancement of fish and wildlife habitat.

Reasons Not Accepted

The FWWG felt that this alternative would be more appropriately addressed by the Dredged Material Uses Work Group of GREAT and, therefore, referred this alternative to that work group.

7. Recommendation

Congress should be asked to pass legislation stating the exact legal definition for regulating the barging industry to reduce groundings and resultant spills. Regulations to be defined:

Maximum length of tow	Also define a method
Maximum width of tow	of enforcement for these
Maximum depth of tow	regulations

Maximum horsepower for towboats to minimize prop wash and maximize safety (maneuverability).

Double hull requirements for hazardous chemicals for the prevention of spills.

Reasons Not Accepted

The work group referred this recommendation to the Dredging Requirements Work Group. We felt that we did not have enough knowledge of the subject to adequately evaluate the recommendation.

8. Recommendation

A list should be prepared of all substances presently transported and those materials expected for future transport on the river to determine which substances present an unacceptable (determined by interagency agreement) risk to the environment. These hazardous materials should be prohibited from river transport and alternative means of shipment should be determined for each substance.

Reasons Not Accepted

This question was referred to the Water Quality Work Group. We did not have enough knowledge of the subject to adequately evaluate the recommendation.

9. Recommendation

Funding and direction should be provided to the Soil Conservation Service to fully implement the measures of the Rural Clean Water Act in the 17 counties designated by the Sediment and Erosion Work Group as critical sources of fine sediment in the Upper Mississippi River drainage basin.

Reasons Not Accepted

Although the concept behind this alternative met work group approval, a different alternative was used to form recommendation 5 which addressed implementation of upland erosion prevention measures. The work group felt the above alternative was too vague in expressing fine sediment erosion control concerns. The accepted recommendation (5) also urged Federal and State support of soil and water conservation measures.

10. Recommendation

Authority and funding should be provided for management of the river's backwaters in the following fashion:

a. Provide above noted authority to the Fish and Wildlife Service for management of the Upper Mississippi River Wild Life and Fish Refuge. Management is to be coordinated with the State that has jurisdiction in the area. The authority to manage would include the right to make physical alterations in the backwaters.

b. Or provide above noted authority to the States for management of backwater areas not included in the Upper Mississippi River Wild Life and Fish Refuge. The States would similarly coordinate management of these areas with the Fish and Wildlife Service. Authority to physically alter the backwaters would be included in the authority.

Reasons Not Approved

The FWWG reviewed these two alternatives in an effort to formulate a policy recommendation regarding management of the Upper Mississippi River Wild Life and Fish Refuge. Attempts to develop an acceptable work group recommendation were often thwarted because of conflicting management policies of the Corps, Fish and Wildlife Service and the States. Both of the above alternatives were dropped because

work group consensus could not be reached. Concerns over Upper Mississippi River Wild Life and Fish Refuge authority were eventually presented in recommendations 6, 8, and 10. However, the procedures of recommendations 6 and 8 were not resolved within the work group.

11. Recommendation

The Upper Mississippi River Basin Commission should establish a special conference to address and resolve the misunderstandings and/or conflicts of management authorities and responsibilities for fish and wildlife resources granted to the Fish and Wildlife Service and the States.

Reasons Not Accepted

The work group agreed that authority conflicts needed resolving. However, we could not agree on how to approach resolving the conflicts in a comprehensive fashion and the concept was dropped.

12. Recommendation

The Upper Mississippi River Basin Commission should establish a special conference to address conflicts of management objectives for fish and wildlife management on the river and recommend a comprehensive set of objectives for such management.

Reasons Not Accepted

The work group did not want the Upper Mississippi River Basin Commission to make management decisions.

13. Recommendation

The Secretary of the Department of the Interior should be asked to review the objectives of the Upper Mississippi River Wild Life and Fish Refuge and determine if fish and furbearers should be included as project objectives.

Reasons Not Accepted

The Fish and Wildlife Service representatives in the work group believed that fish and furbearers were already project objectives.

14. Recommendation

Areas on the river's backwaters (locations to be determined by the Service and states) should be closed where boat traffic could be controlled during times of peak waterfowl migration.

Reasons Not Accepted

This recommendation was substantially modified and expanded to become Recommendation 8. However, the essence of the original recommendation (it appears in the procedure of recommendation 8) was not unanimously supported by the work group.

15. Recommendation

The Upper Mississippi River Basin Commission should establish a special conference to address and resolve the conflicts between river management recommendations and State and Federal regulations dealing with floodplain management, water quality, and wetland protection.

Reasons Not Accepted

The work group members felt that the overall GREAT program was already doing this by the design of the program.

16. Recommendation

Past and future introduction of exotic organisms into the Upper Mississippi River corridor should be cooperatively analyzed to determine compatibility with the integrity of native communities. An agreement between agencies should be

established through the Upper Mississippi River Conservation Committee for providing direction for new species introductions. Suitability for continued use of already established exotic species should be determined, and a restrictive list should be created for those found not desirable.

Reasons Not Accepted

Some of the work group members believe that such a procedure already exists through the Upper Mississippi River Conservation Commission and that dealing with past introductions is not very useful. Therefore the recommendation was considered unnecessary.

17. Recommendation

Incompatible public and private uses of areas of the river specifically designated for wildlife and fish management by the Fish and Wildlife Service or the States should be eliminated.

Reasons Not Accepted

The work group felt that the recommendation needed to be conditioned to allow for some uses when they were not incompatible with the refuge. A modification of the recommendation became recommendation 10.

18. Recommendation

Islands associated with deep water, low-flow and away from main channel conditions should be constructed with backwater sediments, not channel maintenance materials. This will extend the life expectancy of critical backwater areas.

Reasons Not Accepted

This recommendation was modified and approved by the work group as recommendation 18.

C. INFORMATION NEEDS RECOMMENDATIONS NOT APPROVED

19. Recommendation

A special Dingle-Johnson, tri-State project to identify spawning and wintering habitat of the major game fishes on the river should be developed.

Reasons Not Accepted

The States could do this already if they placed enough priority on the river. Therefore, a recommendation dealing with State priorities (7) was developed and approved.

20. Recommendation

A program to evaluate dredging in backwater areas for restoration purposes should be developed.

Reasons Not Accepted

This alternative was modified to include island creation evaluation for restoration purposes and was eventually accepted as recommendation 18.

D. SITE SPECIFIC PROJECT RECOMMENDATIONS NOT APPROVED

21. Recommendation

Shoreline protection projects identified by the Corps and the Fish and Wildlife Work Group should be restored.

Reasons Not Accepted

This alternative was modified slightly to form recommendation 20. Recommendation 20 modified the above alternative so that all the areas on the priority list prepared by the work group would be protected.

22. Recommendation

The cuts between the islands separating Lake Onalaska from the main channel should be blocked, or blocking the cuts in the portion of the dike separating Lake Onalaska from the main channel should be investigated.

Reasons Not Accepted

The work group decided to combine these alternatives so that investigation of the effects of altering side channels should be conducted and, if that investigation determines that such alteration could benefit Lake Onalaska, structural measures should be implemented. Basically, recommendation 22 is a combination of the above alternatives.

23. Recommendation

A deflecting wing dam or partial closing dam should be constructed at the entrance if Big Slough just below the Upper Iowa River in pool 9.

Reasons Not Accepted

The work group decided a thorough investigation should be conducted in an effort to determine the best means of reducing fine sediment flow into Big Slough before any alteration should be constructed. Recommendation 24 covers this concept.

24. Recommendation

The log jams blocking either Miley's Run or Jackson's Run in pool 3, R.M. 803, should be removed to open the access from the main channel to North Lake.

Reasons Not Accepted

The work group decided that there was adequate access into North Lake and that it was better for the waterfowl resource

not to improve access.

25. <u>Recommendation</u>

A gated culvert should be constructed through the dike of lock and dam 8 to feed the Reno Bottoms through Pickerel Slough of pool 9 (this would supplement existing 50-cubic foot per second culvert).

<u>Reasons Not Accepted</u>

The work group determined that the flow through the existing culvert was adequate and the benefits of a new culvert would be minimal at this time.

APPENDIX V

FWWG TASK FORCE REPORT:

ISLAND CREATION AS A PILOT PROJECT

EXPERIMENTAL ISLAND CREATION FOR HABITAT ENHANCEMENT

Report
of the
Island Creation Task Force
of the
Fish and Wildlife Work Group
GREAT I

January 1979

This report was prepared to provide justification for constructing islands in backwaters of the Mississippi River. The Fish and Wildlife Work Group (FWWG) did not further refine or take a vote to endorse this report. It was not agreed whether dredged material from the main channel should be used in the construction of these islands. See the FWWG Appendix (p. 84-85) to the GREAT I Final Report for additionl information.

Task Group Members: Pam Thiel, David Kennedy, Jim Holzer, Ron Nicklaus, and Tom Lovejoy of the Wisconsin DNR. Bruce Hawkinson and Nick Gulden of the Minnesota DNR.

EXPERIMENTAL ISLAND CREATION FOR HABITAT ENHANCEMENT

The GREAT I pilot project at Weaver Bottoms has recommended a test of island creation as a means of rehabilitating that area into a more productive fish and wildlife habitat. This method of habitat enhacement, if found to be successful at Weaver Bottoms, also has the potential for increasing biological productivity in other areas of the Mississippi River.

Lock and dam impoundment has created large, open water areas on the lower end of many pools. These often have less biological diversity than other portions of the pool due to sediment accumulation and turbidity caused by wind and wave action resuspending bottom sediments. The major exception is certain benthic organisms which may be a food source for some diving ducks and benthic feeding fishes. Odum (1971) and others have shown that with decreased habitat diversity, numbers and types of species decline, leading to a simplified system having much less inherent stability. The ecological monotypic communities which result are very susceptible to large and sweeping changes in a short period of time. This generally tends to produce a set of circumstances which can lead to undesirable consequences for both the biotic community and for man, the user.

One of the parameters limiting diversity in these areas is lack of stable shallow water areas which would provide suitable substrate for submergent and emergent vegetation. The creation of islands would increase the shoreline development, thus increasing the litteral zone productivity necessary for many fish and waterfowl (Reid 1961). Stated in other terms; islands would increase the edge effect (Leopold 1933) which has been found to increase both species diversity and density (Odum 1971).

The Weaver Bottoms area is similar to many of the lower pool backwaters. Because of productivity shortcomings, the island creation means of enhancing such habitat

should be examined as a viable way to generally improve environmental conditions in certain sections of the river. The following report discusses what benefits would be derived from the island creation method of enhancing these areas within the Mississippi River.

History of Weaver Bottoms shows this area was a highly acceptable nesting and feeding ground for many species of waterfowl (especially during migration) prior to the degradation which has caused present lower use by those same species. The source of that habitat destruction has been identified as a transition from a marsh-like habitat to a more riverine nature (Nielsen, Fremling, Voss & McConville 1978).

To restore the biological productivity of that area, several recommendations have been reported to GREAT as a means of rehabilitation (Nielson et al 1978). One such recommendation, that of island creation, is aimed at reducing impacts which have led to the decline of Weaver Bottoms.

Island creation in Weaver and other backwaters would be designed to reduce several impacts. Because the large open water areas have no means to break up the wind fetch over the water, wind velocities cause wave turbulence on the lake. Results of this wave action cause resuspension of bottom sediments and erosion on the shorelines surrounding the backwater. The result is increased turbidity and therefore decreased light penetatration which causes a reduction of submergent and emergent vegetative and therefore benthos, waterfowl, fish and furbearer production. Decreased vegetation eliminates also any wind breaking action those plants would have on wave action and further compounds the problem.

Island creation would be designed in such a way to decrease wind fetch, act as a buffer on wave action and gives the lake a more calm, backwater state. The

results would cause decreased turbidity and shoreline erosion and more productive plant and benthes substrate. This rehabilitation method if used in other lower pool areas might also be a means to reduce the impacts of dredged material disposal.

Regular channel maintenance is often times troublesome to the environment because of the impacts and degradation caused by disposal. By using dredged sand to create at least part of the islands, a beneficial disposal site would be accomplished for the sand as it increases biological productivity of the area. Construction would be designed to contain the dredged slurry within a pre-dredging prepared containment area made of stabilizing material, rock etc. This would maximize containment of the sand to prevent large amounts of effluent discharge and further movement. There would be significant leakage from the contained area and increased turbidity for a short time following disposal, but those impacts would only be temporary until resettling occurs. Type of construction and containment, and dredging methods would be designed to maximize environmental quality and island size would be dependent on biological and hydraulic engineering recommendations.

Because the islands would be created to enhance fish and wildlife habitat, construction would be designed to most benefically allow use by desired species. DMRP (WES) studies have shown that unless natural vegetaional successional patterns are occasionally interrupted, the islands will lose their wildlife value. According to the COE, the most practical way of providing the needed interruption is by depositing a new layer of dredged material (Saucier, 1978). The islands could therefore be used periodically as beneficial dredged material placement sites. However, periodic maintenance might be preferable to continued blankets of sand. Maintenance would include tree cutting or burning, shoreline protection, predator removal and garbage removal.

Assuming that at least part of the islands may be constructed using dredged material, it should be noted that establishing vegetation on sand islands has proved to be a difficult process. Because of this problem, the islands would most likely need to be capped with a soil substrate, possibly from fine silt sediments, which would support the essential and desired vegetation for mananagement objectives. The use of soil additives for promoting island vegetation has had mixed success (McMahon, Eckblad, 1975), and should be examined further. One such alternative is the use of the waste product fly ash as a soil conditioner with mulch and nitrogen fertilizer, mixed with dredged sand. A revegetation study by Dairyland Power in Brownsville, Minnesota indicated that beach grasses became well established in certain mixtures of this type (DMUWG Appendix, 1979).

Fisheries Concerns

The creation of man-made islands in the Upper Mississippi River could be beneficial or detrimental to the fisheries. The placement amd construction of the islands will be major factors affecting their success and productivity. In addition to creating new islands, the possibility of rebuilding natural islands should also be investigated. The substrate surrounding the island will influence the productivity of the area for both benthos and fish. Sand and soft silt are relatively poor habitats for most species but silty sand and muddy substratum support more diverse and dense communities (Hynes 1972, Odum 1971). Prime stump fields should not be destroyed by the formation of islands. This habitat is used especially by centrarchids for feeding, spawning and cover (Scott and Crossman 1973, Trautman 1957).

All islands should be protected with riprap from wind and flood water erosion. The riprap containments of the islands would provide additional habitat for fish in the lower reaches of the pools. Riprap is an excellent habitat for game and forage fish and serves as production sites for benthic invertebrates (WI DNR, 1978).

Island placement will cause a decrease in turbidity. This will lead to an increase in the abundance of plankton and aquatic macrophytes since light is usually the limiting factor for plant growth in aquatic systems. Whether the decrease in turbidity will be great enough or the affected area widespread enough to produce valuable habitat is yet to be proven.

Haslam (1978) states that often plants are unable to grow in an open habitat because the flow is too fast or the substrate too unstable. However, vegetation will grow well if local protection is provided from the unfavorable factors. Islands would provide protection from an otherwise undesirable environment. Acquatic vascular plants benefit the ecosystem in many ways. They provide food, shelter, dissolved oxygen and attachment substrates for other organisms. In addition, aquatic macrophytes remove and temporarily store nutrients (Mackenthum and Ingram 1967). Vegetation provides a variety of habitats utilized by sport and commercial fish. These habitats are used for spawning, schooling and as cover (reference).

Islands will add stability to the surrounding substrates. This coupled with the riprap of the island will create an increase in benthic diversity and abundance. The prevalence of benthic invertebrates near the islands will attract fish since the most widespread and important foodstuff of running water fishes is invertebrates (Hynes 1972).

Once rooted aquatics become established in an area they exhibit a high degree of persistence and efficiency of propagation (Mackenthum and Ingram 1967). A plant bed can decrease the current and thus increase the sedimentation rate (Hynes 1972, Haslam 1978). Decrease in depth would not be a desirable effect

in the island area. This filling in phenomenon caused by plants is evident in Lake Onalaska (Claflin, 1977). Another negative factor caused by plants is that the decomposition of abundant plant material can contribute to low dissolved oxygen in the winter. High biological oxygen demand caused by aquatic macrophytes is also demonstrated in Lake Onalaska (WI DNR, 1978). Plant respiration, at night, can also cause low dissolved oxygen levels during summer months.

The decline of dissolved oxygen levels during the winter will be offset by dredging deep water areas adjacent to the islands. These deep water areas will probably have to be periodically dredged to maintain their integrity due to sedimentation. In the winter, deep water serves as holding areas for numerous fish. The dissolved oxygen content of these areas are higher than in the shallow areas due to the vegetative decomposition in the shoals. During the summer the deep holes will be stratified in regard to dissolved oxygen but they will be cooler than the nearby shallows. Dendy (1945) found that walleye and sauger aggregate in deeper water in summer than bass, which are found in the shallower water. However, current loving species such as sauger and walleye may not be prevalent in the lower reaches of the pools since they tend to aggregate in the tailwater areas of the upper pools. In a study done on Pool 8 (WI, DNR, 1978), the following fish moved out of the shallower shoal areas into deeper water as the temperatures decreased: smallmouth bass, largemouth bass, bluegills, rock bass, blackcrappie, flathead catfish, fresh water drum, golden redhorse and carp suckers.

Man-made islands could provide valuable fishery habitats in certain open water areas of the Upper Mississippi River. These islands should be created from materials dredged from the site. The basic criteria of these islands will include:

1. Placement in open water areas exposed to significant wind action.
2. Containment and stabilization with riprap and/or vegetation.
3. Establishment of a shallow water area on the protected side of the island.
4. A deep water area adjacent to the island.

Wildlife Concerns

Wetlands in the Upper Midwest are being lost at an increasing rate each year in spite of efforts and federal agencies. As the wetland base declines, available areas for waterfowl nesting also decrease. In order to maintain waterfowl breeding numbers, it is advantageous to maximize productivity that can be gotten from areas currently under management authority.

The Mississippi River corridor is one of the largest permanent wetland areas in the upper Midwest. Dabbling duck production, other than wood ducks, is limited by the configuration and amount of suitable and flood secure upland nesting cover. It has been well documented that dense nest cover in block like shape tends to be the most predator secure (Duebbert and Kantrud, 1974) & therefore the most productive of dabbling ducks. This habitat type is generally lacking in close proximity to wetlands in the Mississippi River system. Its need can be seen as evidenced by efforts of mallards pioneer nesting in alfalfa hay fields on the bluff tops some 300 feet above the river's surface. Success here is limited by agricultural operation and distance to brood water.

Upland nest habitat deficiencies may be partially alleviated through construction of new islands in the actual wetland area of the river system. These should be above grade of the regional flood, be vegetated with dense nest cover, and be at least 4 acres in size. Soil type should be approximate dry to mesic prairie conditions with suitable organic nutrients. Necessary elevation is crucial to sustained production through avoiding flood losses.

A corollary benefit to island construction is the wind-wave breaking capability of a properly placed structure. This will enhance the growth of submerged and emerged aquatics on at least one side of the island. These provide brood cover and bedding areas with vegetative and invertebrate food sources. Also increased aquatic growth will provide food resources for furbearers, particularly muskrats where water depths permit. Beaver may bank den on artificial islands and utilize associated aquatics.

Specifications

Size: 4 to 10 acres

Elevation: Sufficient height for 90% flood free

Placement: Off channel, shallow open water

Soil: Sandy loam - similar to that supporting dry to mesic long grass prairie

Margin: Convoluted and armored

Vegetation: Blackwell switchgrass, yellow sweet clover, alfalfa, reed canary grass, bluestem

Submerged border: Gently graded littoral zone.

The most useful benefit to wildlife in island creation would be to design the upland construction so it would provide suitable nesting habitat for waterfowl. With proper management the islands could be well suited for waterfowl establishment. Isolation tends to afford relatively little disruption from predators. Waterfowl nesting success increases in the absence of predators. Other factors favoring island use are the high ration of shoreline to land mass, and close proximity of brood, food, water loafing sites and nesting cover. Productivity on these islands could be high with suitable cover establishment and the tendency of islands to remain predator free (Hammond and Mann, 1958).

Disadvantages of island creation can be near total loss of waterfowl nest success if a significant invasion of predators occurs at an inopportune time. Habitat maintenance will be a continuing task requiring renovation after several years. This maintenance would be primarily prescribed burning to keep nesting habitat at its optimum.

Conclusion

Because of the potential benefits island creation has for promoting habitat enhancement, the pilot project at Weaver Bottoms should be implemented. However, before any construction takes place a physical model or hydraulic study should be developed to assist in determining their placement, size, slope and other critical parameters. In fact, any island creation proposal should be given careful biological and hydraulic engineering scrutiny before any action takes place. Results of fish and wildlife adaptability should be monitored to document the success and/or failure of this phase of rehabilitation. From the study at Weaver, future enhancement, restoration, and rehabilitation projects throughout the river system could be implemented if found to be appropriate.

It should be stressed that this island creation discussion and the Weaver Bottoms recommendation should not be intrepreted by the Corps of Engineers as blanket endorsement to indiscriminately construct islands out of dredged material as a 9 foot channel maintenance alternative and label this type of action habitat enhancement. Island creation should only be an enhancement method that is site specifically analyzed before construction takes place.

Literature Cited (Island Creation Appendix)

Claflin, T. O. 1977. Lake Onalaska rehabilitation feasibility study. Mimeographed report to the Lake Onalaska Rehabilitation District, River Studies Center, University of Wisconsin-La Crosse. 43 pp.

Dendy, J.S. 1945. Predicting depth distribution in three TVA storage type reservoirs, Trans. Amer. Fish Soc. 75:65-71

Dredged Material Uses Work Group (Great River Environmental Action Team). 1979. Wis. Dept. of Nat. Res. La Crosse, WI p. 27.

Duebbert, H. F. and K. A. Kantrand. 1974. Upland duck nesting related to land use and predator reduction. J. Wildl. Manage. 38(2):257-265.

Hammon, M.C. and G. E. Mann. 1956. Waterfowl nesting islands. J. Wildl. Manage. 20(4):345-352.

Haslam, S. M. 1978. River plants. Cambridge University Press. 396 pp.

Hynes, H. B. 1972. The ecology of running waters. University of Toronto Press. 55 pp.

Leopold, A. 1933. Game management. Charles Scribner's Sons. N.Y.

Mackentnum, K. M. and W. M. Ingram. 1967. Biological associated problems in freshwater environments, their identification, investigation and control. U.S. Department of the Interior, Federal Water Pollution Control Administration. 287 pp.

McMahon, G. and J. Eckblad. 1975. The impacts of dredge spoil placement on the Upper Mississippi River, Prepared for National Science Foundation Student - Originated Studies. 181 pp.

Nielsen, D. N. and C. R. Fremling, R. N. Vose, D. R. McConville. 1978. Phase I study of the Weaver-Belvidere area Upper Mississippi River. Prepared for U.S. Fish and Wildlife Service, St. Paul. 111 pp.

Odum, E. P. 1971. Fundamentals of ecology. W. B. Saunders Co. 574 pp.

Reid, G. K. 1961. Ecology of inland waters and estuaries. Van Nostrand Reinhold Company. 340 pp.

Saucier, R. T. 1978. Dredged material - waste product or resource? Water Spectrum (U. S. Army Corps of Engineers) fall. p. 7.

Scott, W. B. and E. J. Crossman. 1973. Freshwater fishes of Canada. Fish Res. Board Con. Bul. 84. 966 pp.

Trautman, M. B. 1927. The fishes of Ohio. Ohio State University Press, Columbus. 683 pp.

WI Dept. of Natl.Resources, 1978. Mississippi River Work Unit Annual Report 1977-1978. Mimeographed report. 172 pp.

APPENDIX W

WINTER'S LANDING

FISHERIES HABITAT COMPARISON

BURIED VRS. UNBURIED WING DAMS

MINNESOTA DIVISION OF FISH AND WILDLIFE
Section of Fisheries

Mississippi River Survey
Winters Landing - River Mile 708.5
Pool 7 - Winona County, Minn.

Federal Aid Project - Statewide Fish and Wildlife Surveys - FW1R21 - Study VI

Type of Survey - Mississippi River Bottoms Survey

Dates of Survey, Mapping and Photo Nos. - Photo number and date of aerial photography used in mapping - U.S. Army Corps of Engineers Environmental Study Maps - flown 9-4-73; sheet no. 401-7-12. Dates of survey - July 8, 14 and October 6, 1976.

Field Crew - Gary Grunwald, Larry Watson, Mark Ebbers

Area Name - Winters Landing

Area Identification - Legal Description T.105,106N.; R.5W;S.1,36. Area surveyed is at Mississippi River mile 708.5, Pool 7, 1,000 feet west-northwest of the main navigation channel. D.O.W. No. 85-1 (River mile indicated is miles above mouth of Ohio River.)

Land Ownership - Private

County - Winona County, Minnesota

Nearest Town - 1.5 miles north-northwest of Dakota, Minnesota

Accessibility - Nearest public access is at Dresbach, Minnesota, River Mile 705.1

Other Access Areas - Main navigation channel

Reason for Survey - The area is included in an inventory of fish and wildlife habitat of the Mississippi River bottoms.

Survey Request - Bruce Hawkinson, Lake City Area Fisheries Manager

Previous Investigations - Upper Mississippi River Habitat Classification Survey - March 1971, Sternberg, Minn. DNR

Lake Area - Does not apply to this site.

Depths - See map #3 (depths recorded to nearest foot).

Miles of Shoreline Surveyed - 4,900 feet

Inlets and Outlets - None

Water Level Controls - U.S. Army Corps of Engineers Lock & Dam #7, at River Mile 702.5 has the greatest impact on water levels affecting this site. Lock & Dam #6 at River Mile 714.2 also affects water levels at a lesser degree.

Benchmark - Top of green steel fence post located near bottom sampling station #2. (See map #1) Water level 10.3 feet below top of post. Benchmark established 7/8/76.

Nature and Use of Immediate Watershed - See Upper Mississippi River Habitat Classification Survey

Topography - Wooded bluff, highway and railroad grade, flood plain forest islands, dredge spoil deposits, sand islands, and marsh areas make up the relief of the surrounding land.

Land Use - Immediate - Milwaukee Railroad right-of-way 100%

Vicinity - U.S. Highway #61 right-of-way 20%, private homesite 5%, flood plain forest and sand islands 75%

Nature and Use of Shoreline - This site is composed entirely of dredge spoil placed by the Corps of Engineers during channel maintenance. The spoil abuts Milwaukee Railroad right-of-way. Slope of this site is gradual slope to waters edge. Area is used for sunbathing and swimming.

Shoreline Development - Railroad and highway right-of-way and private homesite.

Evidence and Extent of Erosion and Pollution - The spoil site is subject to erosion by high water and evidence of this is supported by the sand spit building on the downstream end of the site. (See map #1)

Water Turbidity and Color - Brown color present due to suspended silt.

Bottom Soil Types - The area has a predominant sand bottom, with some rock area above and below the spoil site. The three wing dams present also have some rock area.

Bottom Soil Type Percent Occurrence - Both bottom sampling stations had 100% sand bottom. Area surveyed has 80% sand bottom, 20% rock and rubble bottom.

Water Quality - No sample taken.

Emergent Vegetation - None noted.

Submerged Vegetation - Five strands of *Potomogeton crispus* was the only vegetation noted. (Near bottom sampling station #1)

Algae - None noted.

Plankton and Insects - See table #II.

Waterfowl Habitat - Poor

Furbearer Habitat - Poor

Other Wildlife of the Area - None noted.

Fishery: a. Natural Reproduction of Fish - Table I
b. Fish and Turtle Abundance - Table III A & B, Table IV. (Table IV is composed of fish sighted and positively identified with the boom shocker, but not captured.)
c. Fish Sizes - Table III A & B.
d. Fish Age - No scale samples taken.

Fish Spawning Conditions - The rock area of this site has value as spawning habitat to the following species: walleye, smallmouth bass, crappies and rock bass. The sand area as spawning habitat would be suitable for some of the minnow species and softshell turtles (Trionyx).

Since no spring field work was done at this site, it is difficult to assess the exact spawning conditions of the area. It is very likely some species not listed use this area for spawning.

Fish Diseases and/or Parasites - None noted.

Clam Beds - The entire shoreline of the area surveyed was walked. No clams were found. A crowfoot clam bar was dragged between wing dams (see map #2). No clams were taken.

Lake Conditions and Fishing - Nothing is known of the fishing pressure of this site, but observations indicate it to be lightly used.

Special Problems - The most recent spoil placement was made during August of 1974. In excess of 69,000 cubic yards was deposited at this site by the Army Corps of Engineers. Before the first spoil placement was begun at Winters Landing, the area was made up of railroad right-of-way embankment, protected with large rip rap. This rock material extended into the water providing excellent fish habitat. Two wing dams of rock construction abutted the railroad embankment and extended approximately 750 feet into the main channel border. This is also excellent fish habitat. Placement of spoil directly on the rock embankment and wing dams has resulted in the loss of approximately 55 water surface acres and excellent fish habitat. Also because dredge spoil assumes a 3 to 1 slope when piled, a large area of submerged sand also exists out from the emergent spoil. (See map # 1)

During periods of high water, spoil is carried downstream to further degrade the fishery value of the area. Excellent fisheries habitat along the railroad grade below the spoil site is threatened by the very existence of this spoil site.

A request has been made from the Lake City office through the Great River Environmental Action Team I to the Corps of Engineers to remove this spoil to a beneficial use site. (See enclosed letters.)

During the electrofishing portion of the survey on the wing dams and rock habitat of this site, five River Redhorse - Moxostoma carinatum (Cope) were collected. This species of redhorse was not known to exist in this area and are the first to be taken and identified by this office. Three specimens of

this species were sent to Dr. James C. Underhill (University of Minnesota) for placement in the Bell Museum of Natural History.

The following quotation is taken from Northern Fishes by Eddy and Underhill, Copyright 1974. "We have specimens of the river redhorse from the Minnesota River between Jordan and Belle Plaine, but none from the Mississippi River south of St. Paul. The species was taken in the 1890's in Iowa, but Harlan and Speaker (1969) reported that it had possibly become extinct since then in the Mississippi River. The river redhorse may have been eliminated from all but the relatively clear waters of Lake St. Croix and the St. Croix River."

In a personal communication with Dr. George Becker, University of Wisconsin, dated November 5, 1976, the following information on the river redhorse was obtained:

> "It inhabits pools and moderate to swift water over hard bottoms of gravel and rubble. The bottom and water conditions must be favorable to the production of mollusca. Mollusca apparently being the primary food. River redhorse are threatened, rare, or extirpated in the following states: Wisconsin, Michigan, Illinois, Iowa and Indiana. Areas inhabited by river redhorse are to be kept inviolate to any disturbance, including increasing silt load and other polluting substances."

Along with the river redhorse and other species of fish collected at this site, it is evident that further degradation of the area must be prevented. Pool 7 has approximately 25 miles of shoreline on the main channel. 3.7 miles of which is rip-rapped bank protection. The habitat loss of the site surveyed is estimated at 2,000 feet of rip-rapped shoreline, 800 feet of submerged rock wing dams and 55 surface water acres.

Winter oxygen levels were not monitored at this site due to the constant current present.

Present Fish Population Status - The variety of species collected (27) shows a substantial population of game fish, rough fish and forage species. Major species status of the area surveyed is as follows:

	Rearing	Dwelling
Walleye	x	x
Sauger	x	x
Smallmouth Bass	x	x
Largemouth Bass	x	x
Sunfish Species		x
Crappie Species	x	x
Catfish Species	x	x
Rock Bass	x	x
Carp		x
Redhorse Species	x	x
Freshwater Drum	x	x
Forage Species	x	x

Record of Past Management - None.

Ecological Classification - Smallmouth Bass - Channel Catfish - River Redhorse

Summary Discussion and Addition Notes - The abundance and diversity of the fish sampled at this site shows the preference of rock habitat versus sand areas (Tables III A&B). The existance of river redhorse at this site is linked to the remaining rock habitat available for food production and dwelling area. The turbidity associated with dredging and the movement of sand by high water would be detrimental to the continued existance of river redhorse.

Approximately 5.5 surface water acres and 2,800 feet of rock habitat at this site have been lost as a result of dredge spoil disposal.

As evidenced by the sand spit building on the lower end of the spoil site when high water levels occur, this spoil will eventually move onto the excellent habitat of the railroad embankment below. Ideally the spoil should be removed from the area, or at the very least, armored with rip-rap to contain it and help to replace the fish habitat lost.

The aerial photo from which the maps were drawn, was flown in September of 1973. In August of 1974, dredge spoil in excess of 69,000 cubic yards was placed on the site by the Army Corps of Engineers (see attached letter, dated 8/23/74).

We have altered the original map in accordance with our field survey and feel it is accurately updated.

Water levels during the survey period were normal and stable.

Type of Sampling Gear Used - Shocking was done with a boom-type shocker, using a Kohler 230 volt A.C. generator, 3 phase current, and controlled by a rheostat to limit the amperage output. Amperage used in collecting varied from 5 to 6 amps, depending on water conductivity.

Bottom sampling was done with a 6 x 6 inch Ekman dredge.

Shoreline seine dimensions are-40 ft. bag seine, 6 ft. depth, 3/16 inch mesh.

Crowfoot clam bar size - 54 inches long with 90 metal crowfeet.

Credits and Signatures - Preliminary report by Gary Grunwald
Classification and Recommendations by Gary Grunwald
Approved by

Bruce Hawkinson

Bruce Hawkinson
Area Fisheries Manager
Date January 24, 1977

James Schneider

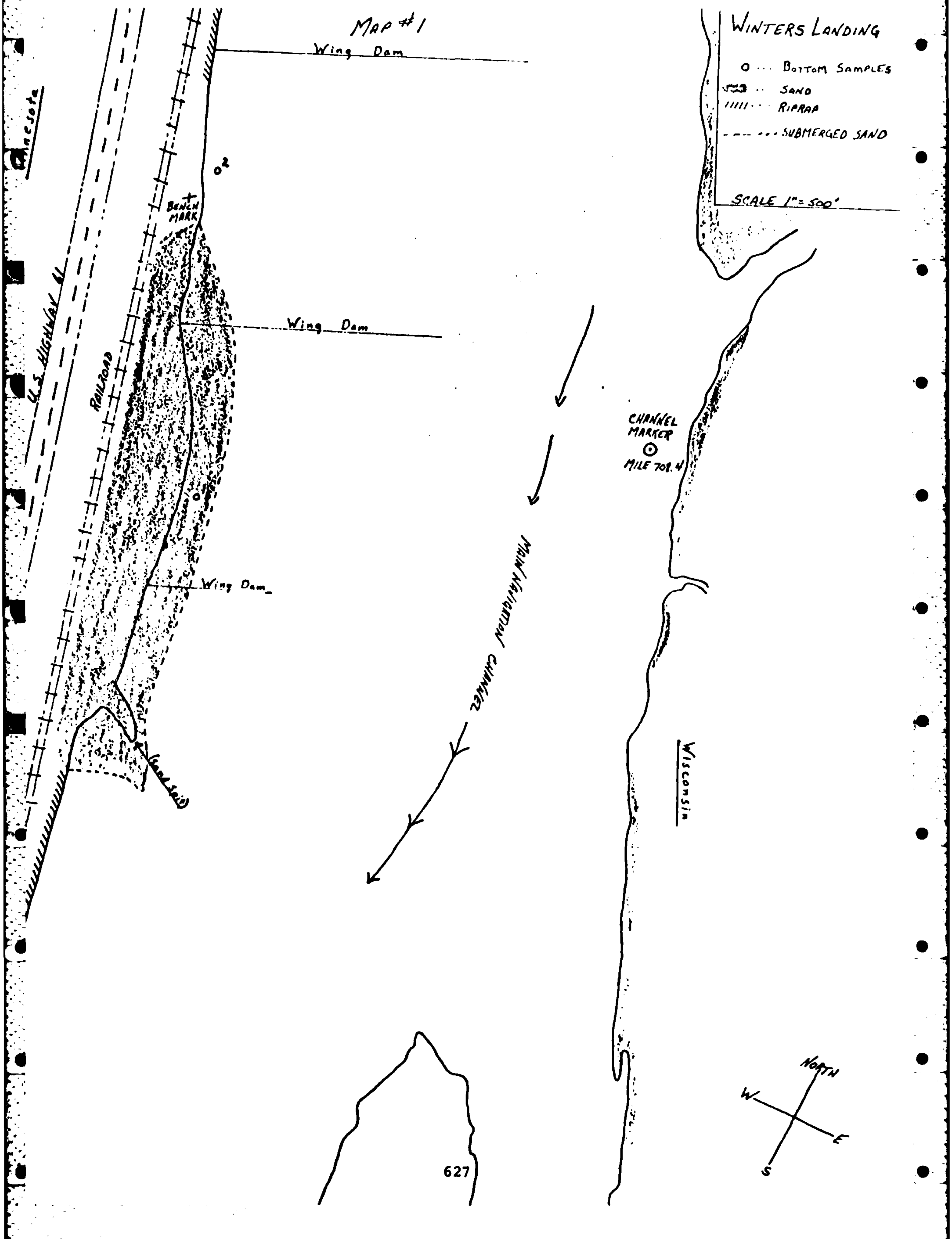
James Schneider
Regional Fisheries Supervisor
Date 031577

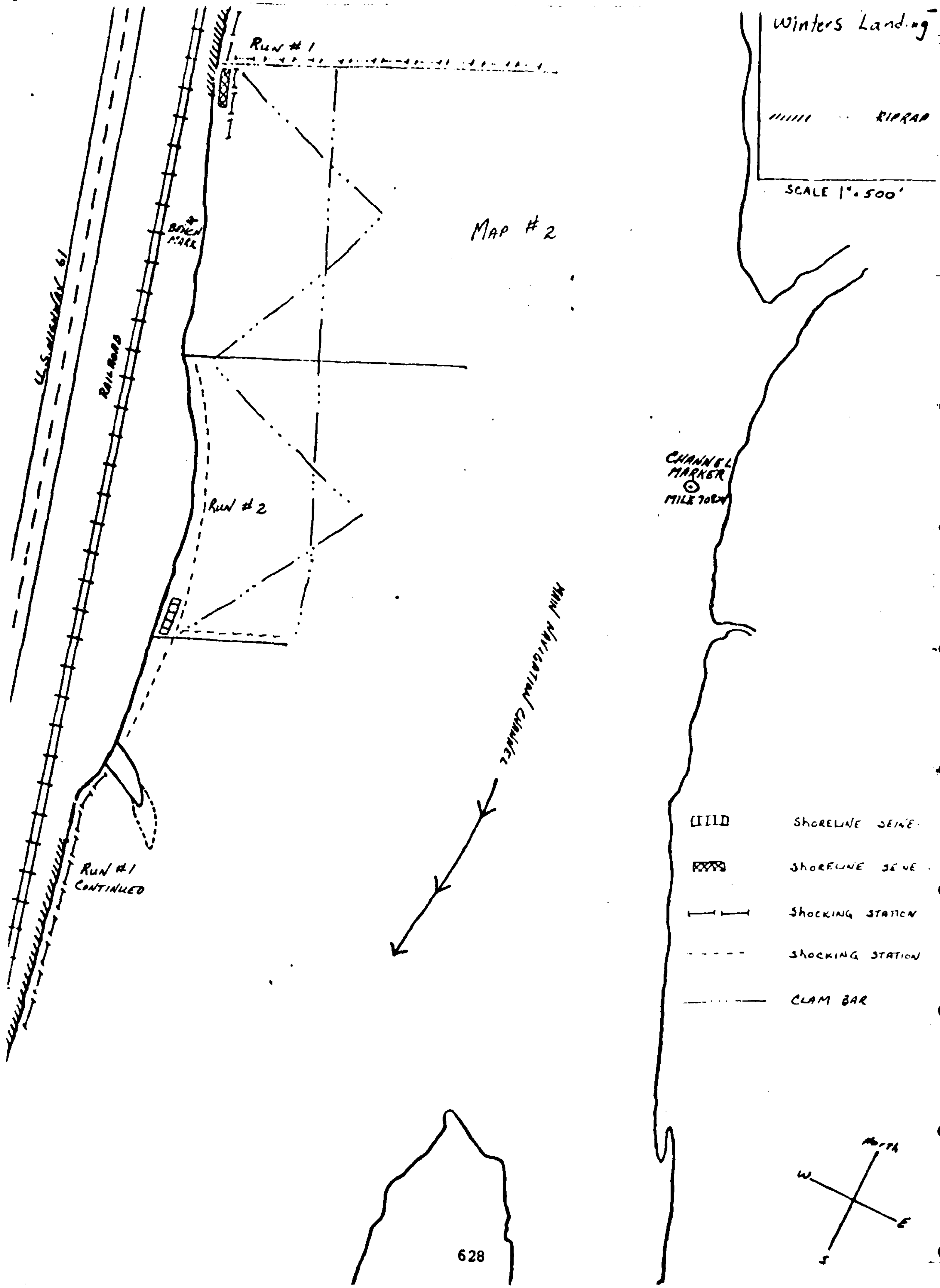
Management Recommendations - It is recommended that the dredge spoil present be removed to restore the habitat lost. The very least that should be done is containment by rip-rap to stabilize the site and restore fish habitat lost. The rock habitat at this site is far too valuable to the aquatic and fish species of Pool 7 to allow this site to remain in its present state.

Federal Aid Project - FW-1R-21, Study VI

WINTERS LANDING

MAP & TABLE INDEX


Map #1
Winters Landing
O ··· Bottom Samples
··· Sand
////··· Riprap
--- ···Submerged Sand
Scale 1" = 500'
Wing Dam
Wing Dam
Wing Dam
Bench Mark
Railroad
U.S. Highway 61
Channel Marker
Mile 708.4
Main Navigation Channel
Wisconsin
North
W
E
S


Winters Landing
RIPRAP
SCALE 1" = 500'
Map #2
Run #1
U.S. HIGHWAY 61
RAILROAD
BENCH MARK
Run #2
CHANNEL MARKER
MILE 70R
MAIN NAVIGATION CHANNEL
Run #1 Continued
Shoreline seine
Shoreline seine
Shocking station
Shocking station
Clam bar
North
W
E
S

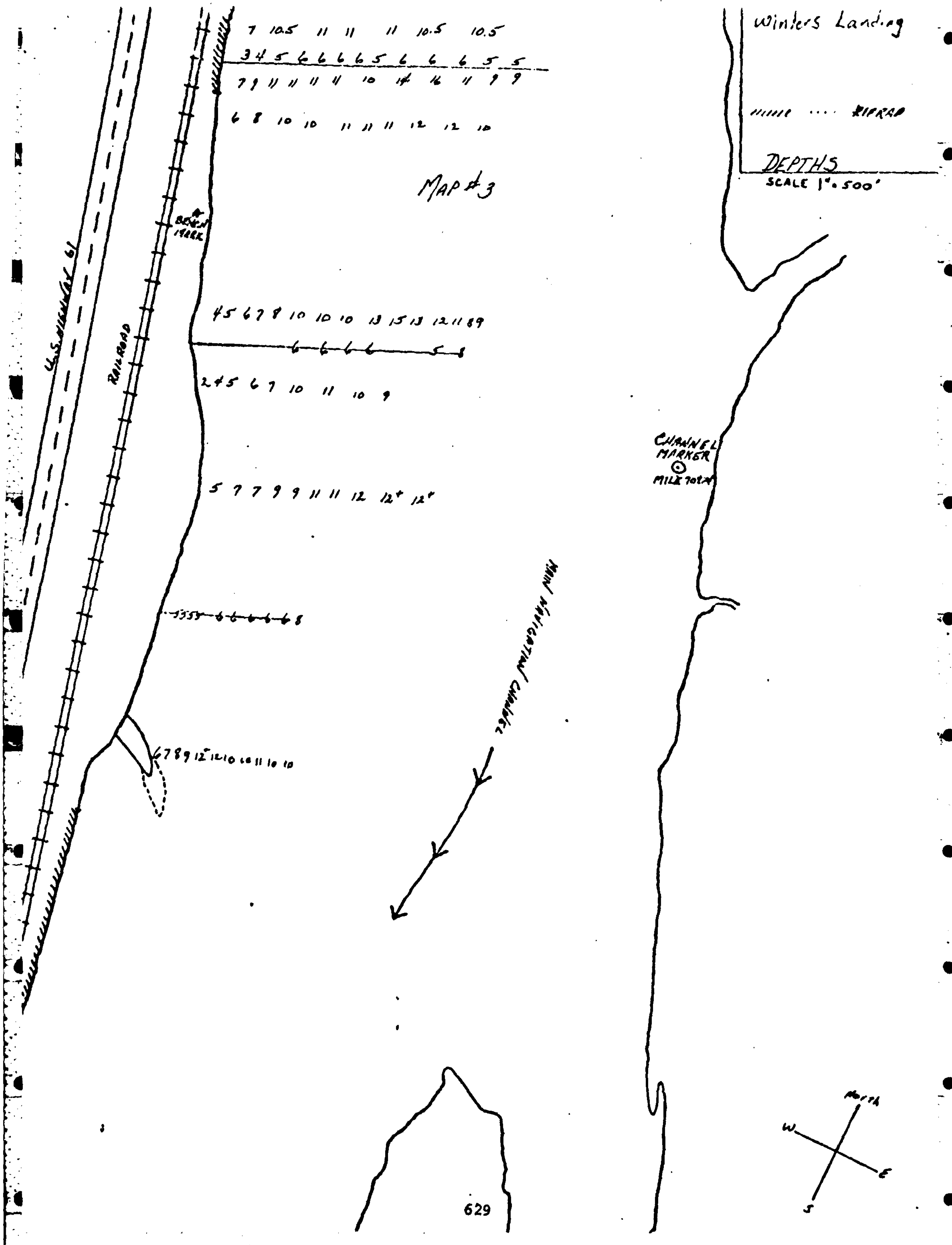

Winters Landing
RIPRAP
DEPTHS
SCALE 1" = 500'
MAP #3
U.S. HIGHWAY 61
RAILROAD
BENCH MARK
7 10.5 11 11 11 10.5 10.5
3 4 5 6 6 6 6 5 6 6 6 5 5
7 9 11 11 11 11 10 14 16 11 9 9
6 8 10 10 11 11 11 12 12 10
4 5 6 7 8 10 10 10 13 15 13 12 11 8 9
6 6 6 6 5 8
2 4 5 6 7 10 11 10 9
5 7 7 9 9 11 11 12 12+ 12+
5 5 5 5 6 6 6 6 6 8
6 7 8 9 12 12 10 10 11 10 10
CHANNEL MARKER
MAIN NAVIGATION CHANNEL
North
W
E
S

Table I — Winters Landing

River Mile 708.5

Date Sampled 7-14-78

County(ies) Winona

Natural Reproduction of Fish - Shoal Water Seining

Seine Measurements: Length 40 feet, Depth 6 feet, Mesh size 3/16 - inch square

	Station Number in ( )		show number of seine hauls made at each station				Totals
	1 (I)	2 (II)'	3 ( )	4 ( )	5 ( )	6 ( )	
Total linear distance covered - feet	50	50					100 Linear Feet
Greatest water depth - feet	3	3					
Bottom Soil Type	Sand	Sand					
Amount of Vegetation ++	None	None					
River Stage	Normal-stable	Normal-stable					
Wind Intensity and Direction +	N/A	N/A					
Time (Military) of Day and Date	N/A	N/A					
Bench Mark Reading #	10 ft. 4 in	10 ft. 4 in.					

Size and Numbers

Species***	YY**	O*	YY	O	YY	O	YY	O	YY	O	YY	O	Totals YY	Totals O	Totals All
Smallmouth bass	17		24										41		41
White Crappie			1										1		1
Shorthead Redhorse			1										1		1
Log Perch		2		1										3	3
River Shiner				5										5	5
Spottail Shiner		34		8										42	42
Redfin Shiner		1												1	1
Slenderhead Darter		2												2	2
River Carpsucker	47												47		47
Gizzard Shad	1												1		1

++ Heavy, Moderate, Light, None, etc. + Strong, Moderate, Light, Calm.

*** Group separately minnows and darters without identifying them, unless readily identifiable in field. Preserve sample for later identification in laboratory.

** YY - Young-of-year or fingerlings

* O - Others, includes yearlings and adults, minnows and darters. Take scale samples from sizes of fish, especially game fish, not taken in test nets.

\# Distance from top of B.M. to water surface.

' Due to the steepness of the bottom along the riprap at Station II, the seine could only be extended halfway. This station was very difficult to seine.

Table II Winters Landing

Bottom Samples - 1976

	Station No. 1	Station No. 2
Odonata		
Zygoptera		
Coenagrionidae	X	
Diptera		
Chironomidae	X	
Ephemeroptera		
Baetidae		X
Annelida		
Plesiopora		
Tubificidae		X
Trichoptera		
Leptoceridae		X
Gastropoda		
Lymnaeidae		X
Pleuroceridae		X

Table III A Winters Landing
Boom Shocking
Run # 1 Rock Area

Dates of Shocking 7-8-76, 10-6-76

Fish Sizes

County(ies) Winona

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Northern Pike	Channel Catfish	White Bass	Rock Bass	Green Sunfish	Bluegill	Hybrid Sunfish	Smallmouth Bass	Largemouth Bass	Black Crappie
2.0-2.9						6				
3.0 - 3.4						2				
3.5 - 3.9				2				1		
4.0 - 4.4					1			1		
4.5 - 4.9							1			
5.0 - 5.4										
5.5 - 5.9				4					1	
6.0 - 6.4				2				3	1	
6.5 - 6.9				3		1				
7.0 - 7.4				1				1		
7.5 - 7.9				2				5		
8.0 - 8.4				1				2	1	
8.5 - 8.9								2		
9.0 - 9.4				1						
9.5 - 9.9										
10.0 - 10.4										3
10.5 - 10.9			1					1		
11.0 - 11.4								1		
11.5 - 11.9										
12.0 - 12.9								1		
13.0 - 13.9								2		
14.0 - 14.9								1		
15.0 - 15.9		1								
16.0 - 16.9		3								
17.0 - 17.9		3								
18.0 - 18.9		5								
19.0 - 19.9		1								
20.0 - 20.9										
21.0 - 21.9	1	1								
22.0 - 22.9		1								
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	1	15	1	16	1	9	1	21	3	3

Table III A (continued)

Winters Landing
Boom Shocking
Run # 1 Rock Area

Dates of Shocking 7-8-76, 10-6-76

Fish Sizes

County(ies) Winona

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	Gizzard Shad	Carp	Quill-back	Silver Red-horse	River Red-horse	Short-head Rdhorse	Fresh-water Drum			
3.0 - 3.4										
3.5 - 3.9										
4.0 - 4.4										
4.5 - 4.9										
5.0 - 5.4										
5.5 - 5.9										
6.0 - 6.4										
6.5 - 6.9										
7.0 - 7.4										
7.5 - 7.9										
8.0 - 8.4						1				
8.5 - 8.9										
9.0 - 9.4						1				
9.5 - 9.9										
10.0 - 10.4										
10.5 - 10.9				1						
11.0 - 11.4										
11.5 - 11.9										
12.0 - 12.9							1			
13.0 - 13.9										
14.0 - 14.9	1					4				
15.0 - 15.9										
16.0 - 16.9			1	1		3				
17.0 - 17.9				1						
18.0 - 18.9				1						
19.0 - 19.9										
20.0 - 20.9		1		1						
21.0 - 21.9										
22.0 - 22.9		1		2						
23.0 - 23.9					2					
24.0 - 24.9		1								
25.0 - 25.9					1					
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9					2					
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	1	3	1	7	5	9	1			

Table III B Winters Landing
Boom Shocking
Run # 2 Sand Area

Dates of Shocking 7-8-76, 10-6-76

Fish Sizes

County(ies) Winona

Length - Frequency Distributions
Species and Numbers of Fish in Length Groups

Total Length in Inches	White Bass	Small-mouth Bass	Large-mouth Bass	Quill-back	Silver Red-horse	Short-head Rdhorse	Fresh-water Drum			
3.0 - 3.4										
3.5 - 3.9										
4.0 - 4.4										
4.5 - 4.9				1						
5.0 - 5.4				1						
5.5 - 5.9				2						
6.0 - 6.4				2						
6.5 - 6.9										
7.0 - 7.4	1									
7.5 - 7.9					1					
8.0 - 8.4										
8.5 - 8.9			1							
9.0 - 9.4										
9.5 - 9.9										
10.0 - 10.4										
10.5 - 10.9										
11.0 - 11.4										
11.5 - 11.9							1			
12.0 - 12.9		1				1				
13.0 - 13.9						3				
14.0 - 14.9										
15.0 - 15.9						1				
16.0 - 16.9					1					
17.0 - 17.9					1	1				
18.0 - 18.9					1					
19.0 - 19.9										
20.0 - 20.9										
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
TOTALS	1	1	1	6	4	6	1			

Table IV Winters Landing
Fish Sightings
Boom Shocker

Date	Run No.	Species	Adult	Yearling	Young-of-Year
7-8-76	1	Channel Catfish	11		
		Bluegill	1		
		Hybrid Sunfish	1		
		Smallmouth Bass		9	
		Gizzard Shad			abundant
		Carp	1		
		Silver Redhorse	28		
		Shorthead Redhorse	4		
		Freshwater Drum	1		
10-6-76	1	Flathead Catfish		1	
		Smallmouth Bass	1		
		Sauger	3		
		Carp	1		
7-8-76	2	White Bass		2	
		Bluegill	1		
		Smallmouth Bass	2		
		Sauger		1	
		Walleye	1		
		Silver Redhorse	3		
		Shorthead Redhorse	6		
		Freshwater Drum	1		
10-6-76	2	Gizzard Shad	1		
		Quillback			65
		Freshwater Drum	1		

Table V Winters Landing

Fish Species - 1976

Common Name	Scientific Name
Northern Pike	Esox lucius
Channel Catfish	Ictalurus punctatus
Flathead Catfish	Pylodictis olivaris
White Bass	Morone chrysops
Rock Bass	Ambloplites rupestris
Green Sunfish	Lepomis cyanellus
Bluegill	Lepomis macrochirus
Hybrid Sunfish	
Smallmouth Bass	Micropterus dolomieui
Largemouth Bass	Micropterus salmoides
White Crappie	Pomoxis annularis
Black Crappie	Pomoxis nigromaculatus
Sauger	Stizostedion canadense
Walleye	Stizostedion vitreum vitreum
Gizzard Shad	Dorosoma cepedianum
Carp	Cyprinus carpio
River Shiner	Notropis blennius
Spottail Shiner	Notropis hudsonius
Redfin Shiner	Notropis umbratilis
River Carpsucker	Carpiodes carpio
Quillback	Carpiodes cyprinus
Silver Redhorse	Moxostoma anisurum
River Redhorse	Moxostoma carinatum
Shorthead Redhorse	Moxostoma macrolepidotum
Log Perch	Percina caprodes
Slenderhead Darter	Percina phoxocephala
Freshwater Drum	Aplodinotus grunniens

STATE OF MINNESOTA

Office Memorandum

DEPARTMENT NATURAL RESOURCES

TO : Eugene R. Gere, Director
Division of Waters, Soils & Minerals

DATE: August 23, 1974

FROM : Ken Reed, Supervisor
Hydrographics Unit

SUBJECT: Mississippi River
Winter's Landing

Met Robert Story, Regional Administrator and Richard Sternberg, Area Fisheries Manager in Winona and proceeded to the dredging site near Winter's Landing. The dredge was operating near the intersection of Cuts #1 and #3 picking up the temporary stock piles of spoil that were placed in the river. We walked to the dredge via the planking over piping on the pontoons. Mr. Fluckiger, Dredge Captain, stated that he thought they would finish the project on Tuesday or Wednesday, August 27 or 28. He estimated the present dredged material was between 1/5 and 1/3 of the total amount to be excavated. He further stated that the original volume of 69,000 cu. yd. will be "slightly" increased because a wider cut is needed to pick up the temporary stock piles placed in the river channel.

The spoil placed at the designated site had (2:00 p.m. 8/22/74) eroded through the banks of the old spoil deposition a distance of 85' out into the river. The old spoil was approximately 150' out into the river, so this gives us a total distance of 235' from the toe of the railroad and old river bank. This 85' delta existed for a length of approximately 400'. Returning the next morning, (9:00 a.m. 8/23/74), I found another 100' of piping added and the channel encoachment was 105' out into the river along 475'. I estimated that the distance out into the river will not greatly exceed the 105' I found on Thursday morning unless the length of the disposal site will not accommodate the total amounts to be dredged. I also expect the currents to diminish this width somewhat and of course the high waters next spring will further diminish the width returning the spoil to the river so it can be dredged again. The depth of the dredged material is in excess of 15' at the highest point and will kill the trees growing along the toe of the railroad. Unless requested, I will not monitor the project again. Final inspection will be by Jeff Featherstone, Bureau of Planning. Photos being developed.

KDR:kac

APPENDIX X

EFFECTS OF WATER LEVEL FLUCTUATIONS ON MUSKRAT SURVIVAL: A TOPICAL SUMMARY OF A LITERATURE SEARCH

The Effects of Water Level Fluctuations on Muskrat Survival in Marshes

Topical Summary of a Literature Search

November 28, 1977

prepared by
Michael J. Vanderford
U. S. Fish and Wildlife Service
Saint Paul Field Office
Saint Paul, Minnesota

The Effects of Water Level Fluctuations
on Muskrat Survival in Marshes

OUTLINE

I. Pertinent Basic Background

   A. The Animal
   B. Their Shelter

II. Effects of High Water Levels

III. Effects of Low Water Levels During Winter

IV. Result of Muskrat Being Forced Out of Their Winter Homes

V. Effects of Low Water Levels During Summer

VI. Resilience of Muskrat Populations

VII. Benefits of Stable Water Levels

VIII. Summary

IX. Literature Cited

I. Pertinent Basic Background

A. The Animal

Muskrats are a very viable and strong willed species, both as individuals and as populations, under normal circumstances and conditions. They are timid and quick to take alarm, but are usually able to successfully defend themselves against such primary enemies as mink.[1] The home range of a "marsh dwelling" muskrat is normally within a well defined area of one marsh. The young of the year stay very close to this home range during their first fall and winter.[2] Muskrats which do not have solid shelter within this area are exceptionally vulnerable to rapid environmental changes.[3] Kits are prone to death from rapid environmental changes, even in good shelters.[4] The degree to which a population of muskrats is affected by environmental stresses is influenced by an apparent 10-year cycle phenomena.[5]

B. Their Shelter

Muskrat lodges, which are designed to protect the muskrat from the elements and their enemies, are dependent upon stable water levels to successfully do their job.[6] The lodge is typically built in three layers and at a depth of from six to twenty-four inches of water. Entrance to the lodge is under water, below any ice layer. A lodge can be five feet high by five feet in diameter and is usually built of clumps of aquatic vegetation and mud.[7] A well built lodge will usually last thru a fall and winter.[8]

DATA AND REFERENCES FOR SECTION I

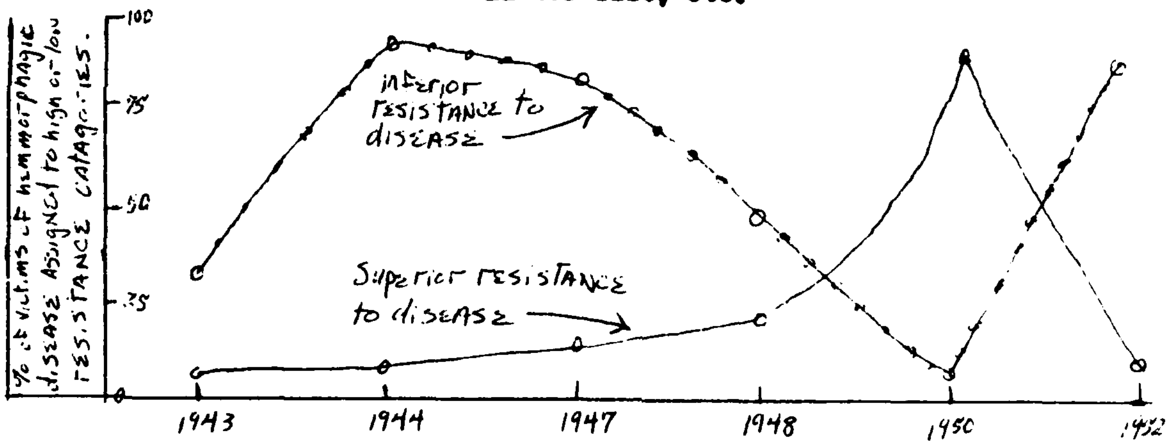
1. Errington, 1961, p. 19: "As long as the muskrats are in possession of their normal faculties for defense or escape, and as long as the environment is in their favor, they rarely have to let themselves be caught by minks."

2. Errington, 1940, p. 174: "Typically, young muskrats of Iowa marshes spend their first fall and winter in, or close to, the home range of their parents."

3. Errington, 1937, p. 497: After a beating rain, four carcasses of freshly killed muskrats were found in a 10 acre area of a marsh. The deaths occured in an area where nests were too flimsy to afford adequate protection. "Elsewhere on the marsh, the population still was mainly resident in lodges of more storm-resistent construction, and had withstood the violence of the storm without detected mortality."

4. Errington, 1937, p. 498: "In a lake or a marsh, an increase in water level may threaten more damage to young muskrats than to adults. Such increases, need not be excessive to result in losses, particularly in the case of helpless new-born litters. New-born litters may often be left around in a haphazard manner..".

5. From Errington, 1954. One example of numerous parameters presented, including population, litter size, etc.



CHANGES IN RESISTENCE TO A LIVER DISEASE COMMON IN MUSKRAT

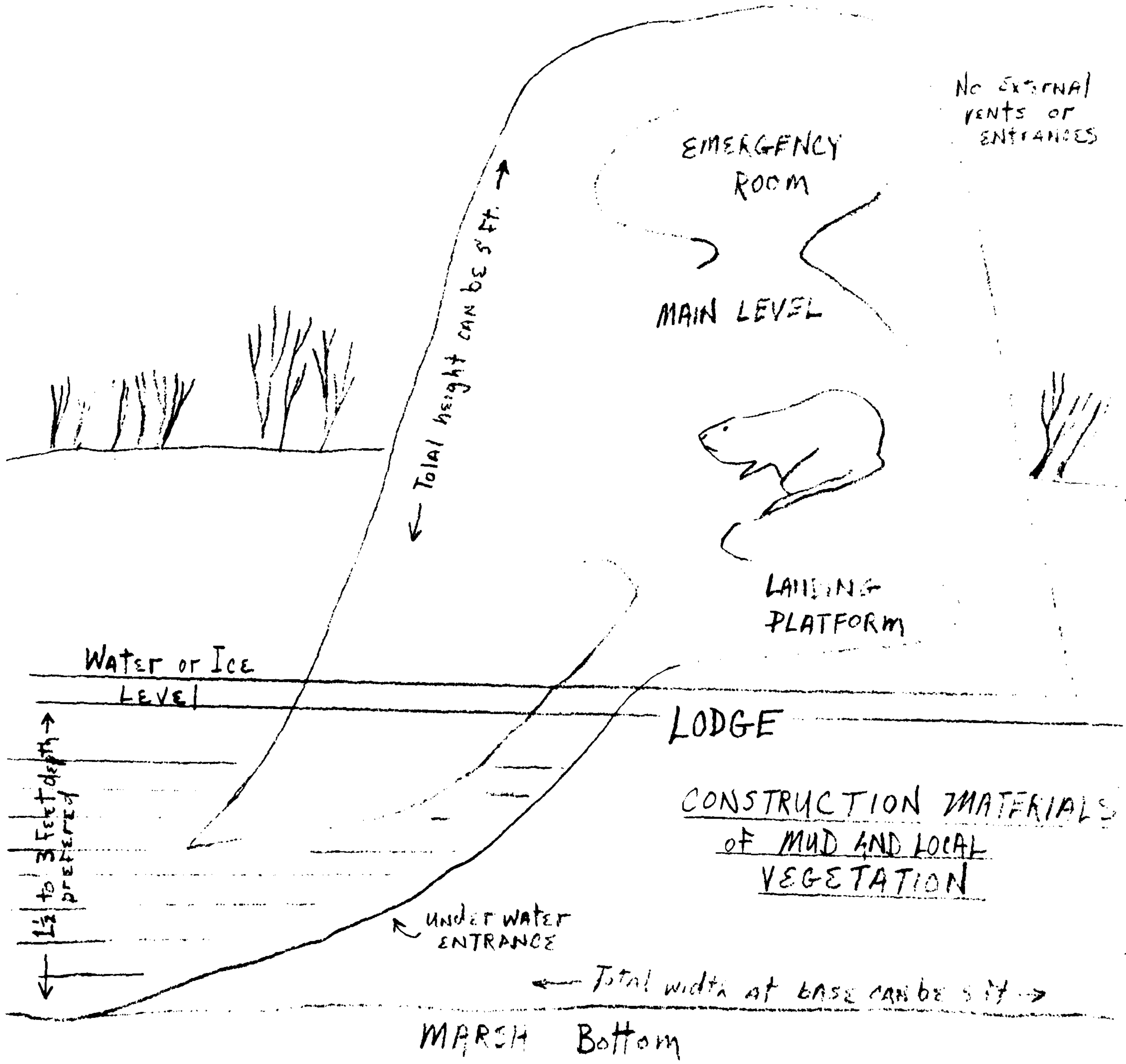
6. From Bellrose and Brown, 1941.

RELATION OF TYPES OF WATER LEVEL TO EMMERGENT VEGETATION AND ABUNDANCE OF MUSKRAT HOUSES

Typr of Water Level	Acres Studied	Acres of Emerg Veg.	Houses per Acre of Vegetation
Stable	4,300	378	3.5
Semistable	3,644	2,716	0.6
Fluctuating	3,623	1,367	0.3

7. <u>From Churchill, 1977.</u>

TYPICAL FEATURES OF A MUSKRAT LODGE



8. Nicholson and Davis, 1957, p. 162: " The 69 houses built from September to December persisted for about 7.7 months..".

II. Effects of High Water Levels

Increased water levels in a marsh can have serious adverse affects on resident muskrats,[1] especially when the increase occurs after "over-wintering" lodges have been constructed in late fall.[2] Rapidly increased water levels as small as a foot can cause drownings of kits left in lodges.[3] Larger increases, especially when accompanied by winds, can result in the destruction of lodges and the subsequent exposure of population to elements and predation.[4] If such displacement occurs with very cold weather or strong winds the individuals become quite vulnerable to predation due to energy spent trying to maintain themselves in the harsh conditions.[5] Drownings and wandering of young and adults are common under these conditions.[6] Crowding at the few refuges or undisturbed lodges during high water causes additional deaths due to intraspecies fighting.[7] Death due to exposure is of major threat to individuals forced out of lodges and refuges.[8]

DATA AND REFERENCES FOR SECTION II

1. Bellrose and Low, 1943, p. 177: After a water level rise of several feet, water flooded the chambers of lodges situated throughout the marsh. When water rise reached 6 feet, lodges had been uprooted. " Debris from wrecked lodges formed a mat of vegetation ½mile long and 2 to 10 yards wide."

2. Ibid, p. 184: Muskrat popoulations exposed as they were, when forced out of their shelter by high water in late fall, suffered great losses due to disease, drowning, and cold.

3. Errington, 1937, p. 498: "The tops of larger lodges may offer reasonable safety to litters evicted from the chambers by flooding, but it by no means follows that the adults will place the young there during emergencies. The young..(may be left) lying in water of sufficient depth to drown them."

4. Bellrose and Low, 1943, p. 175. "A strong wind (and rising water levels) and accompanying wave action knocked many lodges apart and blew others into (nearby banks)."

5. Ibid, P. 175. " The muskrats apparently were so preoccupied with their plight or so exhausted that they allowed us to pass within a few feet before plunging from their resting places."

6. Errington, 1961, p. 25: " Some muskrats thus forced to leave their quarters (by rising water levels) start cross country movements..".

7. Bellrose and Low, 1943, p. 183: "With the shifting of musktats from home territories (due to rising water levels) and with the ensuing crowding of adults, juveniles, and kits, much intraspecific strife was noted... On other refuge sites, two dead kits were picked up one with its body cavity cut open, the other with its hind quarters slashed."

8. Ibid, p.184: "..loss of life caused by the elements and predation (when muskrat forced out of lodges by high water) was suffered."

III. Effects of Low Water Levels During Winter

Reduced water levels in a marsh during late fall or winter can greatly reduce a muskrat populations chances of surviving the winter.[1] Deaths result from cutting off access to food supply, sealed off lodges, overcrowding and cannabalism, and wandering.[2] Low water levels and freezing temperatures can freeze the bottom of a marsh to a depth that muskrats can not penetrate in order to find plant roots for food.[3] Aquatic plants can be frozen solid in shallow water areas less than two feet deep.[4] Muskrats do not commonly store food and depend on an accessible food supply through winter.[5] Fighting over food and cannabalism is common in areas where food supplies have been frozen off.[6] Cut off from food sources in their home range, muskrats will often begin wandering.[7]

DATA AND REFERENCES FOR SECTION III

1. Bellrose and Low, 1943, p.187: "...(Muskrats) living under low water conditions may escape without serious loss in summer but may be seriously affected during cold, winter weather."

2. Ibid, p. 186: "With subzero weather.., water in subterranian tunnels froze,..frost line penetrated the lake bottom..."Too little water,.. resulted in muskrats trying to relocate themselves..".

Errington, 1939, p. 175: "Predation may actually be intraspecific, though canabalism in the muskrat is more often a matter of one animal dying or being killed by another and latter fed upon as a cold carcass."

3. Ibid, p. 178. "Freezing of exposed marsh bottoms in late fall plainly restricts foraging activities of muskrats resident there."

4. Errington, 1961, p. 21: "The same depth of water that would mean comfort and safety to muskrats wintering in a cattail or bulrush marsh may be wholly inadequate for muskrats depending upon a food supply of coontail, pondweeds, and other submerged plant life to be found only in the water lying above the bottom of the marsh or slough."

5. Ibid, p. 15: "Few types of food are really stored by our north-central muskrats, and storage habits are by no means of uniform occurrence."

6. See "2" above.

7. Errington, 1961. p. 22: "With encasement of their food supply and restriction of their movements under the ice, the muskrats start coming outside to see what they can do for themselves."

IV. Result of Muskrat Being Forced Out of Their Winter Home

The vast majority of muskrats which are forced out of their home range in the winter by high or low water levels die before finding new refuges.[1] Destroyed lodges, frozen out food sources, sealed off lodges or overcrowded refuges cause many animals to strike off on their own in mid-winter to try to find better living conditions.[2] However, muskrats can not withstand much direct exposure to severe cold or freezing wind.[3] They have little chance of survival if they leave familar habitat during late fall or winter.[4] They will wander aimlessly, sometimes for miles, usually only achieving a frozen tail, frozen feet, and frozen eyes.[5] Vulnerability to predators is very great at this time.[6]

DATA AND REFERENCES FOR SECTION IV

1. Errington, 1961, p. 22: "Winter-wandering can be so deadly for muskrats in a cold climate that the individuals "staying-put" in their familiar home ranges, freeze-out emergencies not withstanding, have better prospects for survival."

Errington, 1939, p.p 182: "The evidence indicates that but a minor proportion of drought-evicted muskrats find any sort of safety."

2. Errington, 1961, p. 22: "With encasement of their food supply and restriction of their movements under the ice, the muskrats start coming outside to see what they can do for themselves."

3. Errington, 1939, p. 169: "Muskrats connot withstand much direct exposure to severe cold or freezing wind..."

4. Churchill, 1977, p. 26: If the entrance to its lodge is frozen shut by a severe freeze at low water the muskrat will leave familiar area looking for better surroundings. This is usually a fatal move.

5. Errington, 1939, p. 171: "Once the animals leave familiar territory, there seems to be no predicting where they will go...have shown individuals at distances 3 to 21 miles from (home)..."

Errington, 1961, p. 23: "The tips of the tails freeze first when long exposed to cold. In more advance cases of freezing, eyes and feet freeze, or the victims may be so beaten by cold that they just huddle and die."

6. Bellrose and Low, 1943, p. 186: "As might be expected, (muskrats) exposed on the ice were subject to predation."

V. Effects of low Water Levels During Summer

Extremely low water levels in a marsh during the summer or early fall cause muskrats to become very vulnerable to predation. Lodges left on dry bottom by low water are easy targets for raccoon, dogs, and pigs which can dig into the sides of lodges.[1] Individuals become much more vulnerable to predators as they often have to cross large areas of dry ground to reach food. Muskrats are much less able to defend themselves on dry land than in water, and will succumb to predators which normally pose little threat.[2] Although adults can survive for several weeks without a direct source of water, this further weakens them and makes them more vulnerable. Young muskrats up to half grown can not survive without a direct supply of water.[3]

DATA AND REFERENCES FOR SECTION V

1. Errington, 1961, p. 20: "Water shortages can be a most serious handicap to muskrat populations even during periods of comfortable weather, especially if the larger preditors (pigs, raccoons, dogs) dig into lodges..after live muskrats."

2. Errington, 1939, p. 169: "On land, (muskrats) are easily discovered and easily approached, and for all of their militant behavior and the sharpness of their incisors, are neither agile enough to escape nor formidable enough to fight off attackers from which they would normallly have much less fear."

3. Ibid, p. 169: "Adults seemingly may maintain themselves for weeks in hot weather without water except that which they get from moist foods, but field evidence suggests that young animals of post-weaning to half grown size may die of thirst under similar conditions."

VI. Resilience of Muskrat Populations

Muskrats will vigorously begin to re-establish their population in a marsh once water levels have been returned to a tolerable level. If any breeding stock withstands a period of high or low water, repopulation of the area will occur relatively rapidly.[1] The muskrat will rebuild and re-occupy lodges and re-establish home ranges.[2] Within several years, populations may return to prefluctuation levels. However, trapping pelt qualities during this recuperation period will be substantially below normal.[3]

DATA AND REFERENCES FOR SECTION VI

1. Errington, 1939, p. 185: "If muskrats have been exterminated over a county-wide area, no noticeable repopulation may take place for years, but it often happens that a nucleus of breeding stock may survive here and there sufficient to permit fairly rapid recovery when habitat conditions again become favorable."

2. Bellrose and Low, 1943, p. 180: "After .. the recession of the water, muskrats.. constructed their third set of houses (in late December)."

3. Errington, 1961, p. 38: "Some very severe juvenile mortality..can result in sufficient extra breeding beyond the amount that otherwise would occur, to give as about as high a population of muskrats as would be tolerated anyway. I am not saying that the trappers would be delighted with the larger proportions of low-value, August-born "kits" in their later fur catches, but, from the standpoint of balancing and counterbaoancing in population numbers, nature offsets, on the production line, much mortality in just such a way.

VII. Benefits of Stable Water Levels

Relatively stable water levels substantially enhance the health and productivity of a muskrat population.[1] Stabilizing and maintaining water levels in a prairie pot-hole area of 26,000 acres brought the muskrat population from 50 to 27,000 in eight years (Cartwight, 1946).[2] In other investigations, stable water level areas produced two, three, and six times the number of muskrats when compared to adjacent areas which did not have stable water levels.[1,3] The stable areas produced more muskrat food and more healthy individuals.[4]

DATA AND REFERENCE FOR SECTION VII

1. From Donohoe, 1966, p. 323.

Table ?. Summary of muskrat house count surveys during the regular trapping seasons of 1954-55, 1955-56, and 1956-57, Winous Point Marsh, Ohio.

	Approx. Acres	1954-55		1955-56		1956-57	
		No. of Houses	Houses per Acre	No. of Houses	Houses per Acre	No. of Houses	Houses per Acre
Controlled Water-Level Units							
Gardiner	67	186	2.78	73	1.09	48	0.72
Dry Bunch	132	625	4.73	165	1.25	No count	
McRitchie	110	403	3.66	244	2.22	204	1.85
40 Acres	40	31	0.78	30	0.75	33	0.83
Mackey	20	28	1.40	10	0.50	8	0.40
North	390	119	0.31	195	0.50	263	0.67
Darr	80	235	2.94	160	2.00	177	2.21
Mudhole	110	217	1.97	182	1.65	No count	
Totals	949	1,844	1.94	1,059	1.12	733	1.04
Uncontrolled Water-Level Units							
South Creek	285	109	0.38	65	0.23	No count	
Lily Pond	405	56	0.14	69	0.17	162	0.40
West	265	28	0.11	16	0.06	44	0.17
Peach Island	65	38	0.58	4	0.06	No count	
South	132	No count		4	0.03	No count	
Totals	1,152	231	0.23	158	0.14	206	0.21
All Totals	2,101	2,075	1.05	1,217	0.58	939	0.68

2. From Cartwright, 1946, p. 456:

Increase in Muskrat Population on a 26,000 Acre Marsh in Manitoba Subsequent to Stabilizing Water Levels

Year	Population Estimate 1)	House Count
1938	50	---
1939	--	---
1940	--	---
1941	180	37
1942	2,745	549
1943	9,894	1,649
1944	24,384	4,064
1945	26,894	4,479

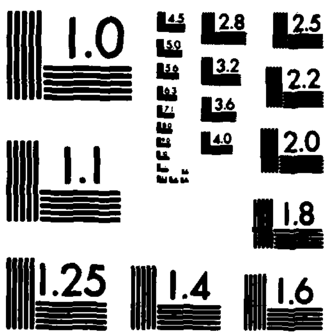
1) estimates by Ducks Unlimited

3. Bellrose and Brown, 1941, p. 207: Comparison of marsh areas with stable vrs. unstable water levels, showed nearly 6 times as many lodges per unit of aquatic vegetation in the stable water areas.

4. Ibid , p. 212: Semi-stable water levels in the backwater lakes producec more emergent vegetation and better habitat conditions for the muskrats than did the adjacent areas in the pool.

AD-A127 212 GREAT I STUDY OF THE UPPER MISSISSIPPI RIVER TECHNICAL APPENDIXES VOLUME 5 FISH AND WILDLIFE PART II(U) GREAT RIVER ENVIRONMENTAL ACTION TEAM M J VANDERFORD SEP 80 5/5

UNCLASSIFIED F/G 13/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

VIII. Summary

Muskrats are very viable and strong willed species, both as individuals and as populations, under normal circumstances and conditions. However, increased water levels in a marsh can have serious adverse affects on resident muskrats, especially when the increase occurs after "over-wintering" lodges have been constructed in late fall. Reduced water levels in a marsh can greatly reduce a muskrat populations chances of surviving the winter. The vast majority of muskrats which are forced out of their home range in the winter by high or low water levels die before finding new refuges. Extremely low water levels in a marsh during the summer or early fall cause muskrats to become very vulnerable to predation. Muskrats will vigorously begin to re-establish their population in a marsh once water levels have been returned to tolerable levels. Relatively stable water levels substantially enhance the health and productivity of muskrat population.

IX. Literature Cited

Baily, V., 1973. The Maryland muskrat marshes. J. Mammology 18(3):350-354.

Bellrose, F.C. and L.G. Brown, 1941. The effects of fluctuating water levels on the muskrat population of the Illinois River Valley. J. Wildl. Mgmt. 5(2):206-212.

Bellrose, F.C. and J.B. Low, 1943. The influence of flood and low water levels on the survival of muskrats. J. Mammology 24(2):173-188.

Cartwright, B.W., 1946. Muskrats, duck production and marsh management. Trans. N. Am. Wildlife Conference 11:454-457.

Churchill, J.E., 1977. The magnificent muskrat. Fins and Feathers 6(10):24-27.

Donohoe, R.W., 1966. Muskrat reproduction in areas of controlled and uncontrolled water level units. J. Wildl. Mgmt. 30(2):320-326.

Donzier, H.L., M.H. Markley, and L.M. Llewellyn, 1948. Muskrat investigations on the Blackwater National Wildlife Refuge, Maryland 1941-1945. J. Wildl. Mgmt. 12(2):177-190.

Errington, P.L., 1937. Drowning as a cause of mortality in muskrats. J. Mammology 18(3):497-500.

Errington, P.L., 1939. Reaction of muskrat to drought. Ecology 20(2):168-186.

Errington, P.L., 1940. Natural restocking of muskrat-vacant habitats. J. Wildl. Mgmt. 4(2):173-185.

Errington, P.L. 1954. On the hazards of overemphasizing numerical fluctuations in studies of "cyclic" phenomena in muskrat populations. J. Wildl. Mgmt. 18(1):66-90.

Errington, P.L., 1961. Muskrats and marsh management. Shackpole Co., Harrisburg, Pa., 183 pp.

Friend, M., G.E. Cummings, and J.S. Morse, 1974. Effects of changes in winter water levels on muskrat weights and harvest at the Montezuma National Wildlife Refuge. N.Y. Fish and Game J. 11(2):125-131.

Nicholson, W.R. and D.E. Davis, 1957. The duration of life of muskrat houses. Ecology 38(1):161-163.

APPENDIX Y

PRIORITY RATING OF STREAMBANK PROTECTION PROJECTS NEEDED ON THE MISSISSIPPI RIVER

(Prepared by Task Forces of the Dredging Requirements Work Group and the Fish and Wildlife Work Group)

Table 1. STREAMBANK EROSION PROTECTION SITE RATINGS

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG: SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG: DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
2	Side of Channel	845.5-845.8	L	3	4	7	1	1	2	6	15	12
2	Side of Channel	844.2-844.6	R	2	3	5	1	2	3	8	16	11
2	Side of Channel	844.0-844.3	L	3	3	6	2	3	5	10	21	6
2	Mouth Sides of MN River	843.9-844.1	R	2	2	4	2	4	6	10	20	7
2	Side of Channel	843.5-843.8	L	2	3	5	2	2	4	2	11	16
2	Side of Channel	843.0-843.3	L	2	1	3	2	1	3	10	16	11
2	Side of Channel	842.1-843.1	R	2	2	4	3	1	4	4	12	15
2	Side of Channel	841.3	R	3	2	5	4	1	5	8	18	9
2	Side of Channel	841.3	L	2	1	3	4	1	5	4	12	15
2	Side of Channel	836.5	L	3	3	6	0	1	1	10	17	10
2	Side of Channel	836.1-836.5	R	3	2	5	0	1	1	10	16	11
2	Side of Channel	835.6-835.7	R	2	1	3	0	1	1	8	12	15
2	Side of Channel	835.3-835.6	R	2	1	3	0	1	1	4	8	19
2	Side of Channel	833.7-835.1	L	2	2	4	0	1	1	4	9	18
2	Head of Island	832.0	L	4	3	7	1	1	2	4	13	14
2	Side of Channel	831.5-837.3	R	2	3	5	1	1	2	8	15	12
2	Head & Side of Island	830.4-831.4	R	3	3	6	1	1	2	8	16	11
2	Head & Side of Island	831.2-831.4	L	4	3	7	2	1	3	4	14	13
2	Small Island	831.2	R	2	2	4	2	1	3	6	13	14
2	Head & Side of Island	829.4-830.0	R	3	3	6	3	1	4	4	14	13
2	Head & Side of Island	828.0-828.3	L	3	3	6	3	2	5	8	19	8
2	Heads & Sides of 2 Islands	827.4-828.0	R	2	2	4	3	3	6	6	16	11
2	Side of Channel	825.9-826.2	L	3	4	7	2	1	3	6	16	11
2	Heads of Islands	825.5-825.8	L	3	4	7	2	1	3	6	16	11

660

Table 1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
2	Side of Channel	825.2-825.6	R	4	3	7	2	1	3	10	20	7
2	Head & Side of Channel	825.9-825.6	L	2	2	4	3	1	4	8	16	11
2	Side Channel Opening	824.1-824.2	R	3	3	6	4	1	5	6	17	10
2	Head of Island	823.7	R	3	3	6	4	1	5	6	17	10
2	Small Island	823.6	R	3	3	6	4	1	5	6	17	10
2	Head of Island	823.2	L	2	2	4	4	1	5	8	17	10
2	Two Small Islands	822.1-822.2	L	2	2	4	4	1	5	6	15	12
2	Head of Island	821.8	L	3	2	5	4	1	5	4	14	13
2	Side of Island	821.5	L	3	2	5	4	2	6	10	21	6
2	Group of Islands	821.4-821.9	R	3	2	5	4	1	5	6	16	11
2	Heads of Islands	820.2-821.0	L	2	2	4	4	1	5	6	15	12
2	Heads of Small Islands	819.5	R	2	2	4	4	2	6	2	12	15
2	Small Islands	817.2	R	2	4	6	1	1	2	4	12	15
2	Group of Small Islands	815.6-816.0	R	2	2	4	1	1	2	4	10	17
3	Side of Channel	815.1	L	1	3	4	1	1	2	2	8	19
3	Side of Channel	814.2-814.9	R	2	2	4	1	1	2	4	10	17
3	Side of Channel	813.5-813.9	L	2	3	5	1	1	2	4	11	16
3	Sides of Channel Opening	813.0	R	3	4	7	3	1	4	8	19	8
3	Side of Channel	812.0-812.9	R	3	2	5	4	1	5	8	18	9
3	Head of Prescott Island	811.8	R	4	4	8	4	2	6	6	20	7
3	Side of Channel	811.5-811.6	L	4	4	8	4	1	5	6	19	8
3	Side of Prescott Island	810.7-811.4	R	4	4	8	4	2	6	6	20	7
3	Side of Channel	810.2-810.4	R	4	4	8	2	1	3	8	19	8
3	Heads of Small Islands	809.9-810.2	L	4	4	8	3	1	4	8	20	7
3	Head & Side of Islands	809.0-809.2	R	4	3	7	4	1	5	4	16	11
3	Side of Channel	808.8-808.9	L	3	3	6	4	2	6	4	16	11
3	Island Heads at Truedale Slough	808.3-808.4	R	4	4	8	4	4	8	8	24	3
3	Heads of Islands	807.4-807.6	R	4	4	8	4	2	6	8	22	5
3	Side of Island	807.3-807.4	R	4	4	8	4	3	7	6	21	6

Table 1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
3	Side of Channel	807.1-807.2	R	3	4	7	4	1	5	2	14	13
3	Side of Channel	806.7	R	4	4	8	4	2	6	6	20	7
3	Side of Channel	804.3-804.6	R	4	3	7	4	3	7	8	22	5
3	Opening at Jackson Run	803.4	R	2	4	6	4	1	5	8	19	8
3	Opening at Miley Run	802.9-803.0	R	3	4	7	4	1	5	4	16	11
3	Side of Channel	802.1-802.3	L	2	4	6	4	2	6	6	18	9
3	Opening at Hardy Run	802.1	R	3	4	7	4	2	6	6	19	8
3	Side of Channel	801.8	L	2	4	6	4	1	5	8	19	8
3	Head & Side of Channel	800.9-801.8	R	3	3	6	4	1	5	6	17	10
3	Side of Channel	799.7-800.0	L	2	3	5	4	2	6	6	17	10
3	Head of Islands	799.3	R	3	2	5	0	5	5	10	20	7
3	Side of Channel	798.1-799.1	L	3	2	5	1	1	2	10	17	10
3	Group of Islands	797.7-798.3	R	3	2	5	1	2	3	8	16	11
3	Heads & Sides of Islands	787.0-797.6	R	2	2	4	1	2	3	10	17	10
3	Side of Channel	797.1	L	4	2	6	2	5	7	4	17	10
4	Side of Island	794.5	R	3	4	7	3	1	4	6	17	10
4	Head of Island	793.3	L	2	4	6	4	3	7	8	21	6
4	Red Wing Harbor Mouth	791.4	R	2	3	5	4	3	7	6	18	9
4	Head & Side of Island	790.0	R	4	3	7	4	2	6	4	17	10
4	Mouth of Second Cut	789.6-790.0	L	2	3	5	4	2	6	6	17	10
4	Side of Baldwin Island	787.8-788.2	R	2	2	4	2	2	4	4	12	15
4	Head and Side of Island	786.2	R	2	2	4	4	1	5	4	13	14
4	Head of Small Island	785.4	L	2	5	7	4	1	5	4	16	11
4	Above Existing Riprap	762.3-763.2	L	2	2	4	5	1	6	6	16	11
4	Head and Side of Drury Island	762.5	R	3	2	5	5	3	8	10	23	4
4	Below Existing Riprap	761.0-761.5	L	2	2	4	4	2	6	6	16	11
4	Head of Indian Slough	760.0	L	2	2	4	2	5	7	10	21	6
4	Head & Side of Crats Island	758.8-759.2	R	2	3	5	5	4	9	10	24	3
4	Mouth of Catfish Slough	758.2	L	2	3	5	5	3	8	10	23	4
4	Side of Island	758.0	R	2	3	5	5	3	8	8	21	6
4	Dredge Disposal Site	756.4	L	2	2	4	4	3	7	10	21	6
4	Head of Grand Encampment Is.	756.3	R				4	1	5	8	13	14
4	Point at Alma Marina	753.9	L	3	3	6	4	2	6	8	20	7

662

Table 1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
4	Group of 4 Small Islands	753.2-754.2	R	3	3	6	2	2	4	10	20	7
5	Head of Island 40	752.8	R	2	1	3	2	2	4	10	17	10
5	Head of Lanes Island	751.9	R	2	1	3	3	2	5	8	16	11
5	Three Small Islands	751.5	R	2	1	3	4	3	7	8	18	9
5	Head of Island	750.7	L	3	2	5	5	1	6	10	21	6
5	Head of Small Island	749.7	L	3	3	6	5	2	7	10	23	4
5	Head of Island 42	749.3-749.8	R	2	3	5	5	1	6	10	21	6
5	Side of Islands	748.2-748.7	L	1	3	4	5	2	7	6	17	10
5	Side Channel Opening	748.4	R	1	2	3	5	3	8	10	21	6
5	Side of Island	746.6-747.0	R	3	3	6	5	5	10	8	24	3
5	Mouth of Sand Run	745.6	L	2	3	5	5	4	9	8	22	5
5	Head of Island	744.5	L	3	4	7	5	2	7	4	18	9
5	Side of Islands	744.1-745.1	R	3	4	7	5	1	6	8	21	6
5	Head of Island	743.6	R	2	4	6	4	2	6	6	18	9
5	Side of Island	742.9-744.0	L	3	4	7	3	1	4	6	17	10
5	Head & Side of Small Island	741.5	R	3	4	7	3	3	6	4	17	10
5A	Side of Channel	736.5-737.4	R	2	1	3	4	1	5	6	14	13
5A	Side Channel Opening	736.4	R	2	1	3	5	1	6	8	17	10
5A	Side of Island	736.3-738.0	L	3	1	4	5	1	6	4	14	13
5A	Below Devils Cut	736.0	L	2	1	3	5	1	6	10	19	8
5A	Side of Channel	735.5	R	3	4	7	5	2	7	4	18	9
5A	Head of Upper Island & Side Channel Opening (2 locations)	735.0-735.2	R	2	4	6	5	3	8	8	22	5
5A	Side of Island	734.2-735.0	L	2	3	5	5	2	7	8	20	7
5A	Side of Island	734.0-734.5	R	1	2	3	5	1	6	6	15	12
5A	Four Small Islands	733.0-733.8	R	1	4	5	5	3	8	6	19	8
5A	Below Existing Riprap	732.0	L	2	4	6	5	1	6	6	18	9
5A	Side of Island	737.0	R	4	4	8	5	1	6	6	20	7
5A	Head of Island 63	731.8	R	1	4	5	5	2	7	2	14	13
5A	Side of Island	731.5	L	1	4	5	5	2	7	4	16	11
5A	Side of Island	730.5-731.1	L	1	3	4	5	2	7	6	17	10
5A	Side of Island	730.4-730.5	R	1	3	4	5	2	7	4	15	12

Table 1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
5A	Side of Island	730.0-730.5	L	2	3	5	2	3	5	6	16	11
5A	Two Small Islands	730.0	R	1	2	3	2	3	5	8	16	11
5A	Side of Islands	728.7-729.6	R	1	4	5	3	3	6	4	15	12
6	Below L & D 5A	728.2	R	1	3	4	1	1	2	6	12	15
6	Head of Island	728.0	L	1	3	4	1	3	4	8	16	11
6	Head of Island	727.7	L	1	1	2	2	3	5	4	11	16
6	Side of Island	727.2	R	2	1	3	3	1	4	4	11	16
6	Side of Island	727.0	R	2	4	6	3	2	5	4	15	12
6	Below Existing Riprap	726.8	L	2	4	6	3	4	7	6	19	8
6	Head of Latsch Island	726.2	L	2	3	5	3	2	5	6	16	11
6	Below Marina Mouth	726.0	L	2	3	5	3	2	5	6	16	11
6	Side of Latsch Island	725.7	L	2	2	4	5	1	6	2	12	15
6	Head of Island below R.R. Bridge	723.8	L	2	4	6	5	1	6	6	18	9
6	Head of two Islands	723.2	L	1	4	5	3	1	4	4	13	14
6	Below Railroad Bridge	723.0	R	2	3	5	3	2	5	8	18	9
6	Head of Island	722.0	L	1	2	3	3	3	6	4	13	14
6	Head of Island	720.8	L	1	4	5	3	2	5	4	14	13
6	Side of Island	719.5-720.8	L	2	3	5	3	1	4	6	15	12
6	Island 76	718.3-718.8	R	3	1	4	0	2	2	8	14	13
6	Head of Island	718.0	L	3	1	4	0	1	1	4	9	18
6	Head & Side of Island 78	717.4	L	3	1	4	0	2	2	4	10	17
6	Head of Island	716.5	L	2	1	3	1	2	3	4	10	17
6	Head & Side of Island	715.5-716.2	R	2	2	4	2	1	3	2	9	18
7	Side of Channel	71[illegible].8-714.0	R	3	1	4	2	2	4	10	18	9
7	Head & Side of Island	713.1	R	2	1	3	5	1	6	6	15	12
7	Head & Side of Island	713.1	L	1	1	2	5	3	8	8	18	9
7	Head & Side of Island	712.7-713.1	L	1	2	3	5	3	8	10	21	6
7	Upper End of Richmond Island	712.7-712.9	R	1	2	3	5	1	6	6	15	12
7	Head & Side of Island	711.7	L	1	2	3	5	1	6	8	17	10
7	Head & Both Sides Pigeon Is.	711.0-711.6	L	1	2	3	3	2	5	10	18	9
7	Side of Channel	710.7-711.0	R	1	2	3	3	1	4	6	13	14
7	Head and Side of Island	710.7-710.8	L	1	2	3	3	2	5	8	16	11
7	Lower End of Island (both sides)	709.9	L	1	4	5	5	2	7	10	22	5

Table 1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
7	Dredge Disposal Site	709.8	R	1	4	5	5	1	6	4	15	12
7	Head & Side of Island	708.5-709.8	L	1	3	4	5	1	6	10	20	7
7	Head & Side of Island	708.2-708.5	L	1	3	4	5	2	7	10	21	6
7	Winters Landing	708.0-708.5	R	1	3	4	4	4	8	10	22	5
7	Head of Island	707.9	L	2	3	5	5	2	7	8	20	7
7	Head of Island	707.6-707.8	L	1	3	4	5	2	7	8	19	8
7	Head of Island	706.8-707.0	L	2	2	4	5	1	6	10	20	7
7	Dakota Islands	706.3-706.9	R	1	2	3	5	3	8	10	21	6
7	Small Dredge Disposal Site	706.0	R	1	3	4	4	2	6	6	16	11
7	Dresbach Dredge Disposal Site (North)	705.4	R	3	4	7	4	2	6	6	19	8
7	Dresbach (South)	705.0	R	2	4	6	4	2	6	6	18	9
7	Side of Channel	704.1-704.2	R	1	3	4	0	1	1	6	11	16
7	Side of Island	704.1-705.0	L	2	3	5	0	1	1	8	14	13
7	Head of Dresbach Island	703.9	L	2	3	5	1	4	5	8	18	9
7	Middle Dresbach Island	703.7	L	2	3	5	1	2	3	6	14	13
7	Lower Dresbach Island	703.5	L	2	2	4	1	1	2	6	12	15
7	Group of Small Islands	703.2-703.7	L	2	2	4	1	2	3	10	17	10
7	All Sides of 3 Islands	702.7-703.1	L	2	3	5	2	1	3	10	18	9
8	Side of Island	702.0-702.1	L	3	1	4	2	1	3	10	17	10
8	Recreational Area Below I-90 Bridge	701.8-701.8	R	4	1	5	3	1	4	8	17	10
8	Below I-90 Bridge	701.7-701.9	L	2	1	3	3	2	5	8	16	11
8	Head of Island	701.6-701.7	L	3	1	4	3	3	6	10	20	7
8	Head & Side of Island	700.8-701.5	R	2	1	3	3	1	4	10	17	10
8	North End Shore Acres	700.2-700.7	R	1	1	2	3	1	4	8	14	13
8	Side of Minnesota Island	700.2-700.5	L	1	3	4	3	2	5	8	17	10
8	Lower End MN Island	699.6	L	1	2	3	1	1	2	6	11	16
8	Head of Barron Island	699.2	R	1	1	2	1	1	2	10	14	13
8	Upper Taylor Island	699.4	L	1	1	2	1	2	3	6	11	16

Table1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
8	Middle Taylor Island	698.8	L	2	1	3	1	2	3	6	12	15
8	Lower Taylor Island	698.5	L	2	1	3	1	1	2	6	11	16
8	Head of Island	697.1	R	2	1	3	3	1	4	6	13	14
8	Head of Isle La Plume	696.8	L	1	1	2	3	1	4	6	12	15
8	Above Entrance to Tarket Lake	696.8-697.4	R	2	1	3	3	3	6	6	15	12
8	Entrance to Target Lake	696.7	R	2	1	3	3	3	6	10	19	8
8	Side of Hintgen Island	695.4-696.3	R	4	1	5	5	4	9	10	24	3
8	Head of Small Island	695.1-695.6	L	4	2	6	5	2	7	6	19	8
8	Above Mormon Slough	694.9	L	5	3	8	5	3	8	8	24	3
8	Head of Coney Island	694.9-695.0	R	2	3	5	5	3	8	10	23	4
8	Small Island	694.1	R	2	2	4	3	3	6	10	20	7
8	Side of Island	693.9-694.6	L	2	2	4	3	3	6	10	20	7
8	Side of Island	692.8-693.8	L	4	4	8	5	2	7	10	25	2
	Head & Side of Island	692.4-692.5	L	3	4	7	5	1	6	10	23	4
	Side of Island	692.0	L	1	3	4	5	3	8	8	20	7
	Head & Side of Island	691.6-693.8	R	1	3	4	5	2	7	10	21	6
	Head & Side of Island	691.6	L	3	3	6	5	1	6	4	16	11
	Side of Island	691.2-691.6	R	2	2	4	5	1	6	6	16	11
	Head & Side of Island	690.5-691.0	R	2	2	4	5	2	7	6	17	10
	Islands at Head of Crosby Slough	690.5	L	4	3	7	5	3	8	10	25	2
	Head of Island above Lite	690.1	R	2	3	5	5	2	7	6	18	9
	Side of Island	690.0-691.5	L	4	3	7	5	3	8	6	21	6
	Both Sides of Crosby Slough	689.8-690.3	L	2	5	7	5	-	5	10	22	5
	Side of Island	689.8-689.9	L	2	5	7	5	1	6	6	19	8
	Island Across From Brownsville	688.7-689.5	L	4	4	8	5	2	7	10	25	2
	Below Brownsville	688.5-688.	R		4	6	5	2	7	6	19	8
	Head & Side of 2 Islands	688.4	L	4	4	8	5	3	8	10	26	1
	Head & Side of Island	687.9	R	2	3	5	5	1	6	10	21	6
	Head of Island	687.7	R	2	3	5	3	3	6	8	19	8
	Side of Island	687.0-689.7	R	3	3	6	3	1	4	4	14	13
	Head of Small Island at Lite	686.7	R	4	3	7	3	1	4	6	17	10

666

Table 1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
8	Side of Island	686.8	L	2	3	5	3	1	4	6	15	12
8	Lower Crosby Slough Islands off Main Channel	686.0-687.0	L	3	3	6	3	1	4	10	20	7
8	Small Island	685.9	L	4	2	6	0	1	1	6	13	14
8	Four Islands on Both Sides	685.0	L R	4	3	7	0	1	1	4	12	15
8	2 Islands Below Middle Slough	684.5	R	5	2	7	0	1	1	6	14	13
8	Head of Small Island	683.5	R	4	2	6	0	1	1	6	13	14
8	Above Genoa at Draft Channel	680.5	R	4	2	6	2	0	2	-	8	19
8	Above L & D 8	679.6	L	2	2	4	3	0	3	2	9	18
9	Head of Island 126	678.3	L	5	3	8	4	1	5	8	21	6
9	Across from Island 126	677.6	R	3	3	6	4	5	9	4	19	8
9	Above Twin Island	677.0	R	2	2	4	4	5	9	4	17	10
9	Head of Twin Island	676.7	R	5	4	9	4	3	7	10	26	1
9	Head of Island	676.2	L	4	3	7	3	3	6	8	21	6
9	Side of Island	675.8	L	2	2	4	3	3	6	8	18	9
9	Head of Island 135	674.7	R	2	1	3	2	1	3	8	14	13
9	Side of Island 135	673.4	R	1	1	2	3	1	4	4	10	17
9	Head of Bootjack Island	671.5	R				5	3	8	8	16	11
9	Head of Battle Island	671.0	L	2	3	5	2	5	7	9	21	6
9	Below Iowa River	670.7	R	2	2	4	3	3	6	-	10	17
9	Head of Island	669.0	L				3	5	8	8	16	11
9	Side of Channel	668.0	L	1	1	2	3	1	4	6	12	15
9	Ofening at Winneshiek Slough	666.9	L	1	1	2	3	1	4	6	12	15
9	Opening at Hummingbird Slough	666.2	R	3	4	7	4	5	9	10	26	1
9	Dredge Spoil Banks	665.5	R				5	3	8	8	16	11
9	Opening at Henderson Slough	664.8	L	1	3	4	5	3	8	6	18	9
9	Opening into Big Lake	664.6	R	2	3	5	5	3	8	2	15	12
9	Opening at Stephas Slough	664.5	L	1	3	4	5	3	8	6	18	9
9	Opening at Indian Slough	664.1	L	2	2	4	1	3	4	8	16	11
9	Head of Island Below Big Lake	663.8	L				1	4	5	8	13	14
9	Head of Island 152	654.8	R	3	1	4	-	-	-	10	14	13
9	Head of Island 153	653.4	R	3	1	4	-	-	-	10	14	13
9	Head of Island 151	653.0	R	2	1	3	-	-	-	10	13	14
9	Group of Islands	652.5	L	3	1	4	-	-	-	10	14	13
10	Head of Jackson Island	646.5	R	2	3	5	5	0	5	8	18	9
10	Head of Island	636.5	R	1	1	2	2	3	5	4	11	16
10	Both Sides Each Channel	635.4-636.4	L				0	5	5	8	13	14
10	Shoreline Below Light	628.5	L	2	1	3	2	2	4	6	13	14
10	Opening at Wyalusing Slough	627.5	R	4	2	6	4	3	7	6	19	8
10	Head of Island	627.5	L	2	2	4	4	3	7	6	17	10
10	Head of Island	626.5	R	4	2	6	4	5	9	6	21	6

Table 1. Continued

POOL	DESCRIPTION	RIVER MILE	DESCENDING BANK	SEWG: Historic bank erosion	SEWG: Relationship w/ historic dredging	SEWG: SEWG Total	DRWG: Relationship w/ historic dredging	DRWG: Recent shoreline erosion	DRWG: DRWG Total	FWMWG: FWMWG Total	EVALUATION TOTAL	PRIORITY NOTATION
10	Opening at Catfish Slough	625.8	L	2	2	4	0	4	4	8	16	11
10	Head of Island	624.9	L	2	1	3	0	2	2	8	13	14
10	Head of Hovie Island	623.4	L	4	1	5	1	5	6	8	19	8
10	Head of Island	620.0	L	2	1	3	3	5	8	8	19	8
10	Head of Island	616.0	R	5	1	6	0	1	1	6	13	14

APPENDIX Z

REQUEST BY THE MINNESOTA DNR
TO RE-OPEN THE MULE BEND SIDE CHANNEL
(RM 748.4RB, Pool 5)

APPENDIX Z

REQUEST BY THE MINNESOTA DNR
TO RE-OPEN THE MULE BEND SIDE CHANNEL
(RM 748.4RB, Pool 5)

STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES
Box #12, CENTENNIAL OFFICE BUILDING • ST. PAUL, MINNESOTA • 55155

March 13, 1980

DNR INFORMATION
(612) 296-6157

Colonel William W. Badger
St. Paul District, Corps of Engineers
1135 U. S. Post Office & Customs House
St. Paul, MN 55101

Dear Colonel Badger:

The Department of Natural Resources has been studying a side channel opening created in October of 1974 by the Corps of Engineers' Derrickbarge Hauser at Mule Bend in Pool 5 (River Mile 748.4). This side channel was recommended by the U. S. Fish and Wildlife Service and Minnesota DNR to provide freshwater flow to the interior of Island #42. A brief history and summary of the project is contained in the Fish and Wildlife Work Group Appendix GREAT I, pp. 122-127. Enclosed is a comparable map of the present status of the opening. The width of flowing water is now 15 feet with a depth of only 8 inches. At present, there is still a flow of fresh water estimated to be 5 to 8 c.f.s. into the island. The extended period of river high water levels throughout the summer of 1979 greatly increased sediment deposits within the openings. We anticipate this side channel will be completely closed off to flow following a normal spring runoff in 1980, as the present depth is only 8 inches.

The source of the sediments, being deposited in the opening, appears to be from previous dredge spoil deposits placed on Island #42 upriver from the opening. Erosion of these spoil areas occur during high water levels and can be expected to continue. Possibly some type of modification to the wing dam immediately upriver from the opening could be made to reduce deposits within the opening; however, a long term solution to avoid this sedimentation is beyond our area of expertise.

Fisheries personnel from our Lake City office have documented the positive effects of this opening on the interior aquatic environment of Island #42. This side channel is presently the only source of freshwater flow into the Island interior.

In July of 1979, a smaller opening to provide additional freshwater flow was constructed on the west side of the island. At present, this new opening is not providing a constant flow, and it will not be until after normal spring runoff that the effectiveness will be known. This new opening was not intended to replace the Mule Bend opening, only to supplement it by providing flow to other stagnant areas in the upper end of Island #42.

We request that the Corps of Engineers redredge the Mule Bend opening to its original dimensions. It is suggested that the resulting spoil material be placed above the Normal Ordinary High Water. Otherwise, a DNR permit will have to be obtained in accordance with my letter of June 4, 1979, to Colonel Forrest T. Gay, III, regarding disposal of dredged spoil material.

St. Paul District, Corps of Engineers
1135 U. S. Post Office & Customs House
St. Paul, MN 55101

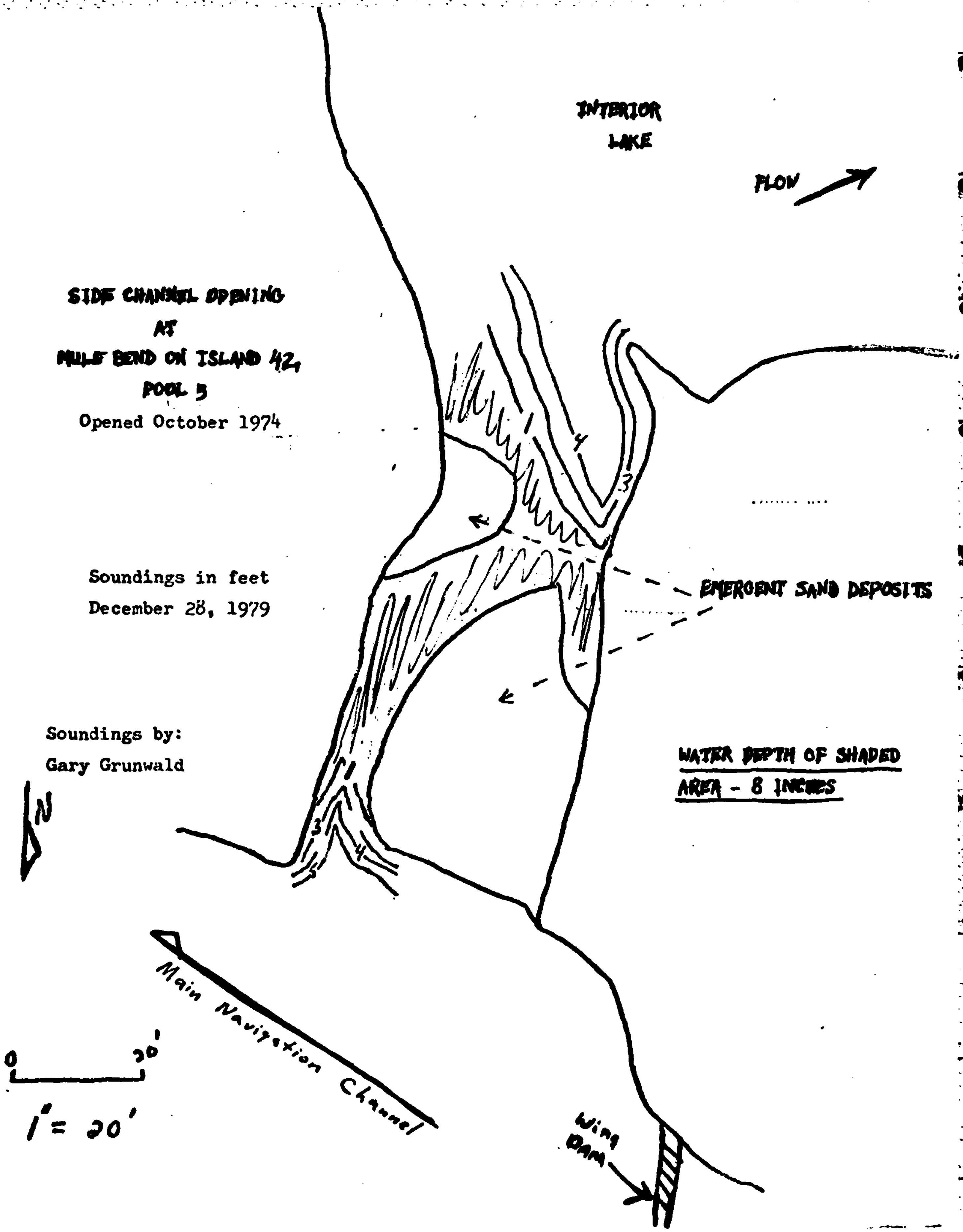
With restoration of aquatic environments such as this, the fish and wildlife habitat can maintain the valuable fishing, hunting and other outdoor sports for which it has long been famous.

Yours truly,

Joseph N. Alexander
Commissioner

JHK:lj

att.


INTERIOR LAKE
FLOW
SIDE CHANNEL OPENING AT MULE BEND ON ISLAND 42, POOL 5
Opened October 1974
4
3
EMERGENT SAND DEPOSITS
Soundings in feet
December 28, 1979
Soundings by:
Gary Grunwald
WATER DEPTH OF SHADED AREA - 8 INCHES
N
3
4
Main Navigation Channel
0
20'
1" = 20'
Wing Dam


FIL